

#1
Atari
Computer
Magazine

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JUNE 1985 VOLUME 4, NUMBER 2

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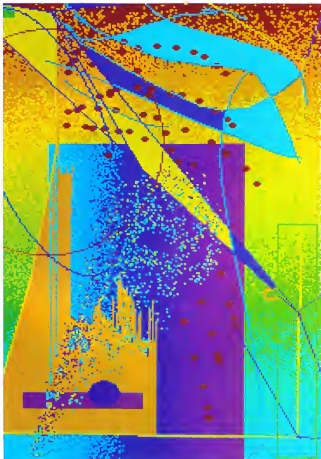
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BEATING THE ZURK BLUES

I've been having problems typing in line
5000 of "Zurk" (March 1985). Please help.
Douglas Hlatt
Largo, FL

*Line 5000 contains the phrase
"SET" = LI * 256". We are going to assume
here that you're using the BASIC XL car-
tridge from O.S.S. This BASIC is more
powerful than Atari BASIC and has
several extra commands. One of these
commands is SET and thus, it cannot be
used as a variable without special
precautions. See page 131 of your BASIC
XL manual on this. "ZURK" runs as
published and should work in BASIC XL
if you change all the SETs to some other
variable name —ANTIC ED*

TYPO II TYPO

TYPO II (January 1985) does not work on
my 1200 XL. It doesn't accept the SET
commands. Any suggestions?

Mary Mueham
Houston, TX

*The original instructions in "How to use
TYPO II" read "BASIC XL cartridge
owners type SET 5,0", etc. We have
subsequently cleared up the wording.
—ANTIC ED*

SOME THOUGHTS ON AL

In most issues of **Antic**, there are type-in
programs listed in BASIC as well as in
assembly language. I've spent many hours
typing in AL programs and found that
none worked. In particular, I've had prob-
lems with "Keyboard Commander",
(March 1985). Can you help me?

Henry Jennings
Detroit, MI

*If the AL listing is an addendum to a
BASIC program, it's printed primarily as
a study example for serious AL program-
mers. Unlike BASIC, machine language
is unforgiving. One mistyped bit of code
and your computer will lock up.*

*"Keyboard Commander" loads into
Page Six. So does MAC/65. Unfortunately,
there is only room for one program in
Page Six, and the big orange super-
cartridge is not about to let it be
"Keyboard Commander".*

*"Keyboard Commander" will run on
Atari Assembler Editor, Atari BASIC and
ACTION! It will not run on MAC/65
unless you relocate the code.—ANTIC ED*

OKIMATE 10 REVISTED

I think that your comments on the Okima-
te 10 were a bit harsh. Perhaps you were
using the wrong type of paper. True,
dumps on plain paper are barely readable.
However, I used black on white dumps on
thermal paper (I use IBM PC Compact
Printer Paper, # 1503926). For color prints,
try Scotch 501 Transparency Film for Plain
Paper Copiers.

Alan Fillmore
Bakersfield, CA

*Several readers have suggested that we
used the wrong type of paper in review-
ing the Okimate 10. Well, **Antic** finds it
refreshing to be considered too tough on
an advertiser for a change. We recognize
that some readers have had better results
with that printer than we did.*

*When we reviewed the Okimate 10, we
used the paper, printhead, printer and
ribbons provided by the Okimate Cor-
poration. We followed the company's
instructions—but then wound up spend-
ing most of a workday tinkering with the
configuration in order to get even the
slightly improved results we printed.*

*We assume that a major company
would ship a working, pre-tested piece of
equipment to assure the best possible
review. If we were, in fact, provided with
a bad printhead that we didn't recognize
at the time, this is a noteworthy problem
that might be faced by anybody purchas-
ing the printer.—ANTIC ED*

OF BITS AND BYTES

What is so special about the number 256,
as in 10 PEEK M(195)*256?

Kevin A. Scott
Algonquin, IL

*The highest number you can have in any
one address is 256. Your Atari is an eight-
bit, binary computer. "Binary" means it
only understands two numbers, 0 and 1.
These numbers are called "bits". Eight bits
make a "byte" and the maximum dif-
ferent combinations of eight bits is 256
(0-255).*

i/o board

Since memory is nothing but a sequence of byte addresses, and we want to reach more than 256 of them, we put two bytes together and have 256 combinations times 256, or, 65,536.

These double-byte numbers are called "words" and the two bytes that make up a word are called the "low-byte" and the "high-byte". When the low-byte goes beyond 255 (remember 0-255) it returns to zero and the high-byte is upped by one.

This means that each unit in the high byte is equal to 256.

Now if, for example, the high-byte contains 2, its value is 2×256 , or 512.

And if the low-byte contains 50, the two bytes together equal 562. Words are stored in the Atari in a backwards order of low-byte followed by high-byte. If the number 562 was stored in locations 88 and 89, 88 would hold 50 and 89 would hold 2. The formula to find the values of these

two locations is: $WORD = PEEK(88) + PEEK(89) \times 256$ —ANTIC ED

BATTERIES MOVES

Batteries Included, publishers of PaperClip (reviewed in Antic last month) moved to 30 Mural Street, Richmond Hill, Ontario, L4B 1B5 Canada. However, please don't order products from them by mail. **A**

help!

KWIK DUMP

"Kwik Dump" (Antic, March 1985) contains an error in line 1070. The last number in that line should be 27 instead of a zero.

THIEF

Readers are having problems typing in "Thief", the March 1985 Game of the Month. The game does run as published, but if your TYPO II code for line 1105 is UK, make sure that the inverse [p] in that line is lower-case.

WIDE TEXT

Bill Morris's "Wide Text" (Antic, January 1985) cannot print a double-width [Z]. Substitute these lines to correct this problem:

```
In the assembler listing:
0600    CPY #27#8    ;8
        BYTES TO A LETTER
```

```
In the BASIC listing:
CT 20130 DATA 216.208.2
13.185.0.224
```

S.A.M. SOURCE CODE

The assembly language listing of "S.A.M. Handler" (Antic, February 1985) contains an error in line 900. LDY #01 should read LDY #01. The BASIC listing is correct, however, and runs as published.

TYPO II BONUS

Ever since our improved TYPO II program typing proofreader began appearing in January, Antic has been getting letters that ask for TYPO II codes to the most popular and difficult pre-1985 programs. These will be in the issue Next Month!

You'll find the TYPO II line codes for the four most-requested listings—"Biff-drop," "Escape From Epsilon," "Advent X-5" and "Adventure Island." And we'll print codes for more Antic golden oldies if we get enough requests.

CHECKED 100 TIMES

I typed in a program from the July 1984 issue and it still doesn't run. I checked my listing 100 times and I have not found a typing error. I also checked the following issues for an error report but didn't find one.

H. Reynolds
Miami, FL

This is typical of many letters we receive from frustrated readers who type in a program only to find it does not run. They may check it many times and when it still won't work, they naturally suspect a publishing error.

Antic does make mistakes, as you can see from the magazine's Help! items and the monthly Error File. But the great majority of program problems come from readers mistyping the listing or misunderstanding the instructions.

If you are having problems with a program that was published more than three months ago, and you don't see a correction printed in either Help! or Error File, you can bet the error is on your end.

That's because most major program problems are discovered within two weeks of publication! But due to the long turnaround time for four-color national magazines, the sooner you can expect that error to appear in Help! is two issues later. For example, a February error should show up in April's Help!

Program errors which appear in Help! are transferred the following month to the Error File where they remain for approximately six months. A complete index of all Antic errors can be found on our ANTIC ONLINE service on CompuServe.

We test all programs on Atari 800s, 1200XLs, 600XLs and 800XLs using both cartridge and built-in BASIC. We use Atari 810, 1050 and Indus GT drives with Atari DOS 2.05, single density.

Some of our listings are more difficult to type in than others. If you are just starting, we strongly suggest that you first try the shorter listings and avoid the frustration of typing in very long listings with Atari special characters.

When using TYPO II, be careful that you have typed in every line. It's not so hard to miss one entire line and TYPO II won't spot it. If you're sure all the lines are there and the program still won't run, recheck each TYPO II line code.—ANTIC ED

A

THE #1 SYSOP

Ron Luks of SIG*ATARI

by MICHAEL CIRAOLLO,
Antic Associate Editor

Back when the IBM PC had just come out and Ron Luks was thinking about buying one, a friend showed him Atari's classic *Star Raiders* game. Luks bought an Atari to play with while he was on the IBM waiting list. As it turned out, he never bought an IBM PC.

Instead Luks, 33, became the system operator (sysop) of SIG*Atari on CompuServe—the world's largest Atari bulletin board, with some 6,000 enrolled members.

At the time he bought his Atari, Luks was a stockbroker and money manager who traded options on the American Stock Exchange. Previously he had taught scuba diving in Miami for a few years. "Fooling around with the Atari was light and fun, like a puzzle, after a high-pressure day in Wall Street," he said.

One of Luks's first peripherals was a modem. "I got the Hayes Smart-Modem, an 850 interface and the original TeleLink cartridge, which came with a CompuServe Starter Kit."

EARLY COMPUERVE

Back then, CompuServe wasn't primarily concerned with sponsoring special interest groups (SIGs). So when Luks first logged onto the system, he "looked all over for the word Atari." It wasn't there. Luks then began to spend time in the Popular Electronics magazine online edition.

"In those days, the network had no online sysops, no help. It was like a

Once you read this latest issue of Antic, log onto CompuServe and type GO ANTIC—you'll see a preview of the magazine's NEXT issue!!

In the ANTIC ONLINE preview, you'll find a comprehensive look at all the stories and programs in the next Antic Magazine—the July Computer Challenges issue.

You'll even find a major excerpt or two from the upcoming issue's featured articles—such as our Atari chess software tournament or our interview with the boss of Strategic Simulations, Inc.

And as a special CompuServe bonus, you can now download from SIG*Atari the complete program that won Antic's Color-The-

Cover Contest. This scrolling two-screen picture won't be on the monthly Antic Disk until next issue, even though you'll find its photo in the current magazine. To download this file, type DL4 at the SIG*Atari prompt. This puts you into Data Library 4, where BRO WINNER.* is what you type next. If you're using an Xmodem protocol program (such as HomePak or Chameleon) choose the WINNER.XMO file. With TSCOPE, use the WINNER.BIN file.

ANTIC ONLINE special bulletins may be downloaded for reprinting in newsletters of users groups affiliated with the Antic Worldwide Users Network. Officers of Atari users groups may write to the Antic WUN Coordination for details.

big puzzle," Luks said. "I kept leaving messages—How can I do this? Why can't it do that?" The messages were picked up by the sysop about once a month.

CompuServe finally collapsed under Luks' badgering. "They made me an assistant sysop and gave me a free flag," which meant he would have free access to the network. This was a good deal for a man who had monthly connect bills "approaching four figures".

FILLING PCS-132

One thing led to another, and Luks

was soon allowed to set up an Atari board. "They said 'There are some empty pages at PCS-132' and I got to fill them up." Luks took as assistant sysops a few of the most active members interested in Atari—such as Michael Reichmann of Batteries Included and programmers Steve Ahlstrom (SynFile +, PaperClip) and Russ Wetmore (Preppik, HomePak).

After an all-nighter over cappuccino in Greenwich Village, Luks came up with the name SIG*Atari. "It's different from 'the Atari SIG,' the 'Radio Shack SIG' and so on. Atari is a word

continued on page 19

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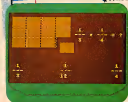
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Children love to sit in front of a piano keyboard and pound out simple melodies. The child's joy comes from immediate success at making music and a rare chance to control the environment.

With an Atari, Logo and just a few short commands, children can have the same kind of musical fun they would have with a piano, but with a little extra learning thrown in.

Turtle Piano converts the computer keyboard's home row—A, S, D, F, G, H, J, K, L, ;, + and *—into a 12-key piano that plays a do-re-me scale in the Key of C without sharps and flats.

It also changes the screen turtle into an eighth note which jumps around to the appropriate spot on a musical staff whenever a note is played. As each note is played, its letter-name is also printed on the screen.

Turtle Piano can also remember your compositions so you may listen to them over and over again.

Though it is not a particularly complex program, Turtle Piano is an engrossing project for young computer users and programmers. So type in Listing 1 and SAVE a copy before you RUN it.

HOW IT WORKS

BEEP, the heart of the program, uses the first sound channel (TOOT 0) to play the notes. After you have typed in the BEEP procedure, if you type BEEP followed by a number greater than 14 you will hear a nice note. The number 260.7 will give you Middle C. Why? A violin string (or anything else) vibrating at 260.7 cycles per second produces a Middle C.

The PLAY procedure ties the home row keys to their assigned pitch values. If a key is pressed which is not one of the home row keys, PLAY will output a frequency of 50000 (too high to hear). So you can use the space bar, for example, as a rest between notes. PLAY, using the SETY command, also draws the turtle on the staff.

Type BEEP PLAY "A to hear Middle C. PLAY takes the input character [A] and searches for its corresponding pitch value (260.7). PLAY passes this value to BEEP, which plays the appropriate note.

Note the relationship between the values for Middle C (260.7) and High C (521.5) in the PLAY procedure. Now, look at the values for the E and F tones. The higher note in each pair is double the pitch value of the lower note. This is always true. BEEP2, the next procedure, uses this fact to produce interesting results.

Try BEEP2 a few times and compare it with BEEP. It uses the second

sound channel (TOOT 1) to play a tone which has half the pitch value of the first note. For example, if you press the [A] key, BEEP2 plays Middle C and the tone one octave below it.

We use the GETNOTE procedure to check the keyboard and store our notes. GETNOTE passes each note to the REMEM procedure, which stores the notes in the variable LINE.

Type [START] to run the program. Now, press the [Y] key to start the piano. This invokes the START procedure. The [C] key calls the CLEANUP procedure which erases the text window and erases all your old tunes stored in LINE. If the [R] key is pressed, the REPLAY procedure will replay the list of notes stored in LINE.

The procedure REPLAY is really tricky. This recursive procedure removes the top note from LINE, plays it, and discards it. Then, it starts again, playing the first note on the shortened list. REPLAY continues to remove notes from the top of LINE, play them and discard them until LINE is empty.

The graphics portions of the program need little comment except perhaps for the LOGO names "STAFFH", "STAFFLO", and "NOAT". Don't forget to type these, too. These variables contain lists of numbers which tell the computer how to reshape the turtles into musical notes. The turtles are reshaped in the SETUP procedure with the PUTSH command.

continued on page 19

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ANTIC AT THE FIRST GEM SEMINAR

Converting IBM PC software to Atari

by NAT FRIEDLAND, Antic Editor

Antic was the ONLY Atari Magazine present at the first GEM Software Developers Seminar held at Monterey, California in February by Digital Research, Inc. DRI created the "Macintosh-like" GEM operating interface that is being used for the new 16-bit Atari ST computers.

GEM has aroused especially wide interest in the computer industry because it's supposed to make it simple to convert software between the IBM PC and clones, the Macintosh, the Atari ST and any other computer that GEM licenses a version for.

Some of Atari's top technical executives were on hand, debating a working ST with a preliminary version of Atari GEM burned into ROM.

Antic was told that Atari still considers itself on schedule for bringing the first production ST computers onto the market in April. Full ST production capacity won't be reached until June. The 10-15 megabyte hard disk for the ST will show up in the summer.

ATARI CAD/CAM?

Remember the 32-bit Atari we reported Jack Tramiel talking about at his November press conference? Well, apparently it is well along in development. Atari still hopes to meet Tramiel's goal of unveiling the machine at the April electronics fair in Hanover, Germany.

Every time Atari engineers talked about the 32-bit computer in Monterey, delighted smiles appeared on their faces. The computer was described to Antic as a "VAX minicomputer on a chip" and a "\$40,000 CAD/CAM computer graphics workstation that will sell for under \$2,000."

LEARNING ABOUT GEM

As for the GEM Seminar itself, the \$800 workshop was highly technical and directed at professional consumer-software programmers who were thoroughly experienced with the C language or with Macintosh window program development.

The Seminar sessions were taken up with highly detailed discussions of GEM development nuts and bolts such as the strict interfacing procedures which are supposed to make "porting" GEM-based programs between different computers a routine one-day process.

Access to GEM windows, debugging, and correct embedding of transfer hooks were among the other technical topics discussed. All attendees were given the two-volume GEM Toolkit documentation. DRI's recommended professional development language was Lattice C, which costs around \$500.

It should be noted that the Seminar was specifically dealing with the just-completed IBM PC version of GEM. Six-disk beta test editions of GEM

were being sold to developers by DRI for \$500. The GEM Library software of prepared graphics routines cost extra.

The Atari version of GEM was not yet ready for beta testing at the time of the Seminar.

WETMORE SUMS UP

Russ Wetmore, author of *Homepak* and *Preppie* as well as other major Atari programs, flew in from his Florida homebase to attend the seminar and then stayed on to see the MacWorld Show in San Francisco.

He spent time at Antic during this period and shared with us the viewpoints of a highly experienced Atari professional programmer.

"I think the developers at the Seminar fell into two groups. One group is totally sold on the GEM goal of making a lot of different computers compatible with each other," said Wetmore. "And for now they are willing to overlook any unanswered questions that came up during the sessions. The second group is taking more of a wait-and-see attitude."

Wetmore expresses some doubt that GEM software will port between different computers as easily as DRI says it will. He also feels that GEM lacks certain built-in features found in the Macintosh interface—such as a text editor—which will make it more

continued on page 19

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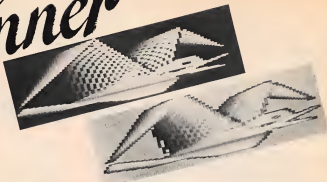


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pixel scanner



by LYN BUCHANAN

The Atari's graphics capabilities are the best you can get for anywhere near the price. The problem most of us run into is that our pictures LOOK as if we did them ourselves.

This doesn't need to be the case, however. Pixel Scanner will perform automatic computer enhancement of a picture by using a process called pixel averaging, which gives a depth and fullness to an otherwise flat picture.

And that isn't all. By tinkering with this program a little, you can simulate the sophisticated computer enhancements used by NASA to bring out small details in satellite photos.

To get started, type in Listing 1, check it with TYPO II, and SAVE a copy.

The program includes a demonstration picture of a stick figure bird in Graphics 9 (lines 200-270), and the pixel averaging routine (lines 100-161). The picture was made using simple PLOT and DRAWTO commands; if you're enterprising, you can create your own picture by changing these commands in the demonstration picture.

The stick figure is drawn at the top half of the screen, leaving room for the enhanced version at the bottom.

HOW IT WORKS

After the picture is drawn, the program looks at each pixel and its surrounding pixels, then places their

This BASIC program introduces you to pixel averaging—an advanced graphics technique similar to the method NASA uses for enhancing satellite photo details. Pixel Scanner works on all Atari computers of any memory size. Disk or cassette.

values into variables. This is done in lines 121-129 by means of the LOCATE command, which positions the cursor at a specified x,y coordinate on the screen and assigns the value of the byte for that data to a specified variable.

The format for a LOCATE command is:

LOCATE (x-coord),(y-coord),
(variable)

The program then adds the values of all the variables together, and divides by the number of pixels sam-

WHAT'S A PIXEL?

The word "pixel" is computer jargon for "picture element." It stands for the smallest controllable element of a screen display.

Naturally, pixel size is determined by computer and video resolution limits, as well as by graphics mode selection. In Atari Graphics 8 mode, for example, a pixel is one scan line high by one-half color clock wide—which essentially matches the resolution of a home television receiver.

pled (line 131). Using that average value, it then re-colors the center pixel, to make it blend more smoothly with its surroundings (line 141).

PIXEL SEPARATING

The Pixel Scanner demo program blends pixels. It could just as easily widen the difference between pixels—as is done in satellite photos to distinguish between extremely small variations.

To do this, change the way the value of K is figured. In line 131, K is figured as the average of all the variables. It would be just as easy to make K vary by, say, 4 times the average, if you change the command COLOR K (line 141) into COLOR K*4.

With a little experimentation, you will begin to find a wide variety of things to do with this routine. Other effects can be achieved by sampling only certain adjacent pixels and not others.

You might also try changing to Graphics 11 (line 201). You'll be surprised at the beautiful blends of colors which are produced.

Lyn Buchanan is a civilian programmer at Fort Meade, Maryland. He is also a programming and systems analysis instructor.

Listing on page 58



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Atari in Lights

*Theater
lighting designer's
Atari C.A.D.*

by MICHAEL CIRAIOLO,
Antic Associate Editor

James Brentano is the stage lighting designer and lecturer for the Drama Department of U.C. Berkeley. He has also been a dedicated Atari hacker since he bought his 800 back in the days when it cost \$800.

When you think about it, designing the lighting for a theatrical production is a highly information-intensive task. You have to combine dozens of color filters, lights, cables and dimmers in order to get the job done.

"A typical show will require 150-200 lights. For each light you must keep track of the following—name or label, any one of several hundred colors, circuit which plugs the unit into the control board, a dimmer switch and stage focus spot where the light is aimed. Also each light unit will have different level settings for up to 200 cues," Brentano said.

Designing the lighting for a show traditionally requires extensive drafting of diagrams and long lists of each light's location, focus and so on. For each show, lights, cables and other material also have to be ordered—more paperwork.

Brentano now uses his Atari to handle the entire process. He wrote a BASIC routine to draw the lighting characters in Graphic 8, and uses **Graphics Master** software to produce a design layout template.

He also uses **SynFile+** to keep track of lighting information which can be sorted—by focus, type of light, etc.

COMPUTER AIDED DESIGN

Brentano isn't content to simply turn the paperwork over to his Atari. He's planning to unite his lighting programs and utilities in one system, a computer aided design (CAD) package for the Atari.

"Nobody has yet developed a system where you're simultaneously hooked into the stage cues and all the lighting unit information," Brentano said.

"For the price of two IBM graphics boards and a whistle, I can produce a package with an Atari, dot-matrix printer, disk drives and the software to do *all* the CAD lighting work," Brentano figured. All for around \$1,000.

"Ideally you'd have onscreen a picture of the lighting diagram, and you'd use a light pen or mouse to circle and call up all the information on given unit."

After producing a package to do CAD lighting design, the next step is direct computer control of the lighting board. "The technology of light board computers is primitive—the interface to all the knobs and controls is expensive," the designer explained.

The light board Brentano uses at U.C. Berkeley costs \$37,000, not including the dimmers. "That's ridiculous when an Atari costs \$120," Brentano said.

"LET'S MAKE A SHOW"

"It's surprising how many stagehands



LINDA TAPSCOTT

own Ataris—they like to play games. And we all play this game together. 'Let's go make a show'. Backstage crafts simply offer bigger and more expensive toys."

Brentano maintains that the Atari appeals to stagehands because of the machine's game tradition and because it's not hard to get inside the computer and play with it.

"You can do a lot of this design with the Macintosh and FileVision," Brentano admitted. FileVision is a visual database which lets you design icons that can be moved around the screen. Each icon also represents detailed information, such as the focus, location and type of each light.

"But Apple has a certain snobbishness I object to," said Brentano, who

believes that the Atari is the best 8-bit machine on the market. "Pong is the greatest thing since sliced bread."

LIGHTING BOARD

Brentano's dedication to the Atari has made it the computer of choice for a theatrical bulletin board he's starting.

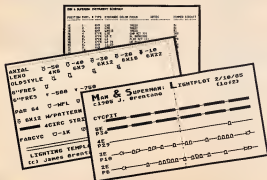
Based on an Atari 800, an MPB 1000C modem and two disk drives, Brentano's bulletin board will cater to the theatrical lighting community. It will have classified ads for jobs, equipment and so on. The board will also feature electronic mail, hints and tips for lighting designers, product reviews and comments.

"Eventually, I want to be able to dump a show's files to the bulletin board, so rental companies can log on, look at the file, and give me a price."

"A problem with theater is that we spend \$10–20,000 per show. Any way to share information saves money," Brentano said. "There's a need for a clearinghouse of information."

Brentano's board will be the only Atari theater BBS in the country—and only the second theater board of any kind. It is called JCN (James' Computer Network). The phone number is (415) 562-3364.

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difficult for professional programmers to work with.

Despite this, Wetmore was positive enough about GEM that he bought the Seminar disks and intends to invest over \$4,500 for a souped-up IBM PC to run Lattice C. "But right now any GEM programs I publish will just be for the Atari," he said, "because it's the only computer that a developer won't be charged royalties for by DRI when the software comes out." 

TURTLE PIANO continued from page 10

As stated earlier, this program is really pretty simple. Readers are encouraged to make it more special. With a little tinkering, Turtle Piano could flash different colors with each note, extend for another octave or two, or include sharps and flats. The basic structure can accommodate all these changes and more. The only rule is to share your ideas by sending them to Antic.

Craig McBain is a third grade teacher in Mt. Clemens, Michigan. His wife wishes that Atari Logo had never been invented.

Using on page 74 

THE #1 SYSPOP continued from page 8

from the Japanese game Go, and SIG "Atari has an oriental sound," said Luks, pronouncing the name quickly and sibilantly, as one monosyllabic word.

MILLION-DOLLAR SIGS

SIGs are now the second or third largest moneymaker for CompuServe, bringing in millions of dollars a year, Luks said. And he has a well-defined niche in that enterprise.

Luks, the "Godfather of SIG 'Atari'",

now works with a CompuServe sysop school and a test SIG where new SIG software is beta tested. He also helped launch the IBM SIG and works eight other boards besides SIG 'Atari'—as well as being OnLine Editor of the Antic CompuServe Edition.

Of course, all that takes a lot of time, "60 to 70 hours a week," Luks figured. As we've found out at Antic when we try to get in touch with Luks, the phone at his Greenwich Village apartment routinely gives off a busy signal till after 3 a.m.

And during regular working hours, Luks is a freelance computer consultant to a major Wall Street brokerage firm.

"Nowhere else can you find a more knowledgeable group on the Atari world than on SIG 'Atari,'" Luks said. SIG 'Atari' members gave constructive input to Synapse Software during its development of the Syn Series. More recently they've done the same for Batteries Included's HomePak.


"Our users decide what service they get and dictate policy," Luks said. However, Luks insists that users maintain a sense of decorum on SIG 'Atari' and that the board not become a haven for pirates.

FREE ACCESS

Luks is committed to bringing the SIG to as many Atari users as possible. If a large users group has never been in SIG 'Atari' before, Luks said he would try to arrange free access to the SIG for a weekend so the group could discover the magic for themselves.

"If we could get a new machine from Atari, we could have 50-60 public domain programs for the ST on the SIG 'Atari,'" Luks claimed. Nor does it appear an idle boast. "On the Macintosh SIG, we had 50 programs when there were only five for sale in the stores."

"All they have to do is ship it. We'll do the rest," Luks promised.

Luks sees his demanding work with CompuServe as an investment in the future. "We're shaping the technology. Also I want to be able to live anywhere, to be geographically independent and able to work over the phone." 

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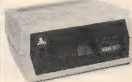
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Let your joystick select program hues!

by JOHN FELTON

Take the tedium out of program color selection with this joystick-driven BASIC utility. Color Palette runs on all Atari computers of any memory size. Disk or cassette.

When the time comes to select colors for your new program, it's *hard* to choose among all the Atari's 128 colors and multiple luminances—if you can't conveniently compare similar shades. Until now, it was a tedious process to find the perfect green for your slime monsters, or just the right red for the sky over Barsroom. You might use SETCOLOR in a program, run it, look at it, break it, adjust it and start over again.

USING PALETTE

Color Palette gives you a better way to use the best home graphics computer on the market.

Type in Listing 1, check it with TYPO II, SAVE a copy, and RUN the program. You'll be looking at a joystick-driven utility for color selection. Listing 2 is the source code for the assembly language routines used in the BASIC program. You don't need to type it in.

The palette's screen is divided into two windows. In the top, you'll see 12 patches of color, each with its hue and luminance numbers and a color register value. The lower right corner is the background color.

The bottom half modifies the color of patches in the top half. Put the cursor over the patch you wish to

modify and press the joystick button. You'll now be able to change colors by moving the stick up and down, and change luminance by moving the stick from side to side. Press the trigger to set that color and move on. To see your values, watch the X in the lower window.

That's all that there is to it. You might note that the top four patches are initialized to the Atari default colors. It is amazing how many programs use these four colors just because it's easier than looking for better ones. Well, no more.

A three-year veteran of the Atari, John Felton is a computer science major at Cal Poly in San Luis Obispo, California.

Listing on page 64



COLOR *the* COVER— CONTEST

By JACK POWELL and MICHAEL CIRAOLO



When we invited submissions for our Color the Cover Contest, we didn't really expect a winner with the diligence, creativity and . . . uh . . . compulsiveness of **Paul Sedgewick**. His adaptation of the January 1985 *Antic* cover was artistically a match for any other entry—but it was also a mind-boggling technological tour de force.

The 23-year-old electrical engineer from Northridge, California spends his days producing delicate military microwave machines. And he put in over 100 hours re-creating *Antic*'s cover with *redefined* characters on two scrolling screens.

Paul decided that the black and white *Antic* January cover needed at least five colors, if not more. He also didn't think one video screen was large enough.

Wanting the highest resolution possible, Paul chose *ANTIC* Mode 4, the only mode which offers both high resolution and five colors. (Mode 4 is a five-color text mode, counting the background.)

He then photocopied the cover, enlarged it and graphed it on a grid approximately 40 squares wide and 50 down—each block representing one mode 4 character.

Next he graphed the cover in even finer detail, dividing each block into a 4x8 pixel matrix.

34 CHARACTER SETS

Having done all this preliminary paperwork, Paul finally reached for his own trusty character set editor. Using the editor, Paul redefined each character block to match the cover. However, there are only 256 characters in a character set—just enough to draw three screen rows.

Rather than re-use characters for different portions of the picture, Paul used display list interrupts (DLI) to actually change character sets while the screen was being drawn. After each three rows of characters on screen, a different set was pointed to in memory.

Paul decided that five colors really weren't sufficient, so he used a vertical blank interrupt (VBI) to draw the picture twice, thus creating extra colors by superimposing the hues. Two overlapping hues of the same luminance created a third color; two hues of different luminances created a vibrating, flickering effect.

The VBI was also used for vertical fine scrolling between two screens, which meant the display list instructions had to be continually refigured.

What began as a simple Color the Cover Contest entry ended in a four-screen phantasmagoria. The VBI alternates between two screens, and the vertical scroll switches between two more. After 100 hours of work,

Paul had created the necessary 34 complete character sets. With an accompanying assembly language program, the entire binary load file occupied 316 disk sectors!

...AND RUNNERS-UP

Nearly 150 readers mailed in entries to the contest. Just about half the entries used the KoalaPad or Atari Touch Tablet with accompanying *Micro Illustrator* (AtariArtist) software. Interestingly the second most used computer graphics tool was "Price's Picture Painter" the powerful program from *Antic*'s September, 1984 issue.

Tim O'Connell, of Mastic Beach, New York used a KoalaPad to produce his strong head-and-shoulders close-up of Utility Man. Our distinguished panel of judges (*Antic* editorial and art departments) particularly liked the way this U-Man seemed to be posing for a hero portrait.

Alfred Gomez of Las Cruces, New Mexico spent several sleepless nights to produce his entry. Gomez demonstrated his good taste by depicting a miniature *Antic* magazine hanging from Utility Man's belt, although this is too small to see in our screen shot. Our judges were also pleased with the excellent use of contrast and color. His successful ef-

and the winner is . . .

Paul Sedgewick



forts "burned my rendition into the retinas of my eyes." He was the only entrant to use the Fun with Art cartridge.

Montreal's **Gaston Aladin** used the Atari Touch Tablet and his own software to produce his highly impressionistic entry. Aladin's work demonstrates interesting, complex background textures captured in a fluid sense of movement.

Nick Turner was "inspired to go to the limit" of his patience in recreating our cover. This programmer from Mountain View, California used AtariArtist cartridge with Atari Touch Tablet to produce a Utility Man that closely resembled our cover. Turner displayed well-balanced colors, a good sense of proportions, and well defined shapes.

When she read about the Color the Cover Contest, **Marta Taylor** ran out and bought a KoalaPad to produce her entry, one of the more abstract renditions we saw. Taylor, who hails from Douglasville, Georgia, depicted Utility Man surrounded by a fanciful collection of balloons. While not a true copy of the cover, the entry contains unique imagination and a charming, simplistic innocence.

continued on page 34



Gaston Aladin



Runner-up winners are not presented in any particular order on these pages. Color The Cover Contest first prize is an Indus GT disk drive. Runner-ups receive their choice of any single item in the Antic Arcade Catalog.

Antic Disk subscribers: You will find the winning contest entry as a bonus on your August disk NEXT month. It was too large to fit anywhere on the current issue's two-sided disk.



Alfred Gomez

runners-up . . .

Tim O'Connell



Nick Turner



Marta Taylor





PRINT SHOP



WELL WORTH THE WAIT!

by JACK POWELL, Antic Technical Editor

Yup. Looks like the dry spell for Atari software has finally ended. At last, the big guns are coming out: EPYX is marketing the fabulous Lucasfilm games, Paper-Clip is on the way, and Alternate Realities will finally become a reality—courtesy of Datsoft.

Then just the other day a bright yellow box came in from Broderbund. The Atari edition of **Print Shop** had finally arrived!

Print Shop is a graphics printing program that Apple owners have been enjoying for quite a while. It's currently Broderbund's hottest selling item, and the reason why is easy to see. From the bright yellow packaging to the foolproof programming, Print Shop is so darn friendly you feel like Bambi has just toddled into your Atari.

When the package arrived, we tore off the wrapping and booted the disk. The very first page of the reference

manual said to ignore the documentation, start up the program and just follow the prompts. Within minutes, the Antic offices were littered with gaily decorated printer paper.

If you've dreamed of being an art director, Print Shop is exactly what you've been waiting for. You'll be cranking out flashy greeting cards, stationery, banners and signs, featuring clever graphics and a variety of different type-styles. You can decorate with ready-made graphics icons that are supplied, or design your own. (My own "Opus The Penguin" has been very well received.) The results are remarkably professional.

The program is entirely menu-driven and leads the user easily through the options. In the tradition of all Broderbund's Apple-oriented programs, there is an almost complete lack of sound, but this is essentially a utility so it's not too bothersome.

Before you rush out and buy Print

Shop, make sure you have a dot-matrix printer capable of graphics. No matter how nice the program, it won't work on your letter-quality Atari 1027 printer. Print Shop handles most graphics printers. They're all listed on the box. If in doubt, call Broderbund.

As fun as it is, Print Shop has its limitations. You've eight type-fonts to choose from and there's no way to design your own. The disk comes with 60 icons or graphic designs. And you may also design your own using the Print Shop graphics editor, but as usual with multiple utility packages, the graphics editor is a crude joystick/Koala Pad pixel editor which does not allow for patterned fills or other desirable sophistications.

It would certainly be nice if we could use one of the many versions of Micro Illustrator to design our icons, but this is not the case. And, since the disk files have been hidden,

continued on page 28

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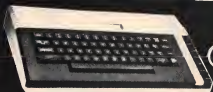
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PRINT SHOP
continued from Page 25

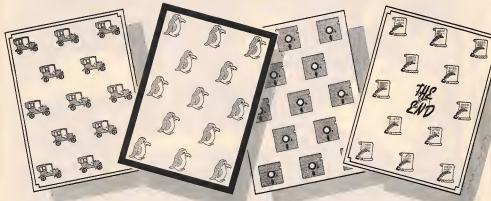
a programming hobbyist would have a difficult time writing a conversion program.

One frustrating omission is Print Shop's inability to make labels. What about all my home-made peach preserves and canned prunes?

Nevertheless, Print Shop is the kind of program that should appeal to a huge audience. I can't think of a better computer gift for children—if the adults will let them get their hands on it. We really should all thank Broderbund for converting this hit software to the Atari. Now if they would only buckle down and get to work on an

Atari conversion of Championship Lode Runner. . .

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Color Inkle Loom

Your Atari master weaver

by GERALD M. HAGOPIAN

Design intricate 39-thread weaving patterns for the inkle loom with this BASIC program. (If you're a weaver, inkle loom won't sound strange.) Color Inkle Loom works on all Atari computers with 24K memory. 24K cassette, 32K disk

Serious weavers regularly face the process of selecting colors and patterns for their various looms. And as you know, displaying intricate color patterns is a job that's duck soup for the Atari. With the Color Inkle Loom program, you can design patterns for use with the inkle loom which—in weaver's jargon—is a two-harness plain weave loom.

This program should be a good start for Antic readers who might wish to develop design software for looms that are more complicated than the widely used inkle.

ATARI WEAVING

Type in Listing 1 and check it with TYPO II. SAVE it before you RUN it.

After the opening screen, you'll see a menu. You can choose to Create a new weaving, Save a weaving, Load

a previous weaving, or Exit the program.

If you are creating a new weaving, you'll be asked for the number of threads per harness, up to 39 each. After typing a number, you'll be asked if you're sure. Type [Y] to continue, anything else to go back.

Then choose colors, starting with harness #1, thread #1, followed by harness #1, thread #2, and so on. In each case, you'll be asked for the color or letter—which you'll take from the marked band of colors across the screen. Once again, you'll be asked if you're sure. Type [Y] to continue, anything else to go back.

When you're done choosing colors, you'll be asked if you're ready to weave. Type [Y] to continue. You can start weaving, or change the intensity of the colors you've chosen. With the spectrum band's range of 16 colors, and the Change Color Value option, you can produce any of the Atari's colors.

Gerald M. Hagopian is a freelance consulting designer working with consumer products and interior design.

Listing on page 60



Play it Again, Atari!

They laughed when I sat down at the 800 XL...

by NAT FRIEDLAND, *Antic* Editor

Okay, I confess. Before I settled on writing I was a committed would-be musician. As a kid and teenager I must have spent hundreds of hours teaching myself piano, rhythm guitar and chromatic harmonica. I played first trombone in the high school band, thus becoming automatically eligible for a music scholarship to state teachers college if I had wished to go.

It was relatively easy for me to pick up the rudiments of playing different instruments. But there would always come a time—much too soon—when I ran into the upper limits of my musical coordination. I could never seem to really master any instrument.

I used to daydream about some kind of future electronic musical instrument coming along that would automate things the things I couldn't get my fingers to do and let me express my musical ideas without being an instrumental whiz. Little did I know those instruments would become a reality—even an affordable reality—in less than two decades.

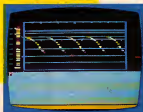
Recently my musical frustrations have been much more localized. It seemed as if all the good musical software and plug-in computer pianos—keys from companies like Sequential Circuits or Passport were being made only for the Apple II or the Commodore 64.

1985 ATARI MUSIC

However, in 1985 all this has changed. Some truly phenomenal new musical peripherals for our favorite personal computer are about to make the Atari the new champion of computer-assisted musicking.

In this article you will read about:

- A new kind of "music generator" software that lets you compose and improvise in real-time at the Atari keyboard. The four-voice sound is tracked by colorful geometric graphics. Press a couple of Atari keys and you'll feel like the next Brian Eno.
- A software and "black-box" product that lets your Atari emulate an advanced 16-track digital recording studio.
- A remarkably powerful new MIDI synthesizer that sells for no more than what an Atari disk drive used to cost.



VIRTUOSO screen.

kids were taking two-hour lessons in creating music on the VirtuosO sound generator and when the sessions were over their parents often had to drag them away from the machines.

VirtuosO is such a unique new approach to musicking that it's not easy to describe. It's one of the closest things in the real world to the multi-arts competitions that Herman Hesse wrote about in his classic literary fantasy *The Glass Bead Game*. In that book, Hesse wrote about chess-like contests where one player's move might be a theme from a symphony and the opponent's countermove could be a line of a poem or a section of a painting. . . .

VirtuosO gives you a user-friendly method of tapping the extremely fast and powerful changes that a computer can control in every aspect of music performance. It bypasses the limits of traditional musical notation

1. VIRTUOSO

At a music studio in Queens, New York last year you'd find three kids at a time sitting in front of Atari computers and listening on earphones while geometric patterns of color flashed across the video screen. These



MIDITRACK II

and uses an almost self-explanatory color graphic display that delivers mathematical insights into the structure of music.

USING VIRTUOSO

You'd enter a musical pattern into Virtuoso from the Atari keyboard, or call up one from about 480 that could be stored on a single disk. The pattern would start sounding and the lines of colors would trace it visually. At this point you could start creating all sorts of changes in the pattern—which you would hear and see *immediately*.

As the pattern was playing, you could change its speed, rhythm, pitch, tone, volume, key scale, etc. You could enter new patterns any time. There's even a Future mode where you can enter changes before they are due to be played. The effect of controlling so much musical power so effortlessly feels something like conducting an orchestra at the same time as you are composing the music that it plays.

In technical terms, Virtuoso is a sound generator that produces four voices from the POKEY chip. You can make instant real-time changes in the voices in any of six parameters. Four computers running Virtuoso can be linked together to have up to 16 independent channels controlled by one Atari.

As a sound editor, Virtuoso can synthesize multiple voices with 1/60 of a second accuracy and tune them within 10 steps of intonation. Any musical passage can be moved anywhere, saved, and replayed in any key and in virtually any rhythm.

COMING SOON

This groundbreaking product is a collaboration between former Julliard Music Professor Joseph Lyons and Frank Schwartz, a highly experienced programmer and electronics designer. Originally, Virtuoso was financed by Warner Leisure Software, who naturally wanted it for the Atari and in cartridge form.

After Warner Software shut its doors last year, Schwartz and Lyons obtained new funding and are hoping to have Virtuoso on the market by August. At this point, Virtuoso is to be on disk, available for either the Atari or Commodore 64, and priced at about \$50.

Not only that, a \$150 MIDI interface for Virtuoso is also being readied for August release. Virtuoso will therefore be usable as a visual language for MIDI controllers—not only for music, but also for lighting and sound effects, lasers, etc. Once again, shades of Hesse's *The Glass Bead Game*.

Lyons and Schwartz are as enthusiastic about the Casio CZ-101 synthesizer as Antic is, and Virtuoso will definitely run on this outstanding electronic instrument—which will provide even greater power, versatility, sound quality and handling ease than the Atari POKEY chip.

PLEASE NOTE that Virtuoso is a product that is still under development and has not yet been released at this writing. Antic will print more news of Virtuoso as soon as it becomes available, so please do not phone or write us asking where to get it yet.

How does Antic know that Virtuoso is for real? There are two reasons. 1. We have heard (and seen) Joe Lyons play four-part Bach Fugues on it. 2. Antic has a first-generation Virtuoso cartridge that Frank Schwartz gave us.

Our prototype Virtuoso cartridge is packed solid with microchips and actually a plug-in board. Its music generating functions are 100% in working order, but figuring out how to play it from only the skimpy documentation notes is not too easy. At present you'd need Lyons standing over your shoulder to explain things, the way he does in his studio lessons.

That's why the final development work is concentrated on making Virtuoso even friendlier to operate. There will be icon menus, an inexpensive membrane keyboard for musical input (if you're not using a MIDI instrument), and six levels of complexity that will gradually take you from beginner to expert status.

2. MIDITRACK II

MIDITRACK II has been wowing them at computer shows and musical instrument shows since last fall. It's available at various professional-music stores around the country or by mail from the manufacturer for \$349. (Detailed manufacturer information will be found at the end of the article.)

Interestingly, your Atari will be the least expensive component of this

continued on next page

music system. Bob Moore of Hybrid Arts, makers of MIDITRACK II, gives a slightly surprising reason why the Atari was chosen to drive the system. "The Atari is the sturdiest of the inexpensive lightweight computers," he said. "We believed it would have the best chance to survive a long professional road tour."

MIDITRACK II disk software and the included MIDIMATE interface box work with any Atari that has 48K memory. The Atari itself does not produce any sounds with its POKEY chip here. It simply acts as the controller for up to 16 channels of information transmitted by MIDI instruments.

WHAT'S MIDI

MIDI stands for Musical Instrument Digital Interface. It's a set of electronic standards—just as ASCII, RS-232 and Parallel Centronics are standards—that allows electronic musical instruments to coordinate and exchange digitally encoded sound information.

Moore, who was primarily a Hollywood studio musician before coming up with the idea for MIDITRACK II, said, "If you've already got an Atari and disk drive, it should cost you no more than \$3,000 to have a fully professional digital recording setup. (To just have fun with your Atari music system, you could get away with \$500 or less. More on this later.)

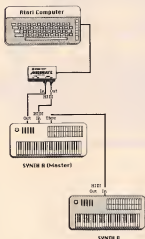
What you need for a fully professional system is a main synthesizer, a drum machine, and probably a second synthesizer to give you a bit more variety of sounds. The second synthesizer doesn't even need to have a keyboard because you can play it from the main synthesizer.

At the other extreme, you could theoretically daisy-chain huge gangs of MIDIMATEs and electronic instruments. You could mix 16 completed tracks onto a single track, make 15 new tracks and mix everything down to track 2, and then repeat the process. You could run a symphony orchestra of synthesizers from a single Atari, even a stadium filled with synthesizers. . .

Normally the way you'd operate a MIDITRACK II system is something like this: First you'd set up a drum pat-

tern and record it on track 1. Next you'd adjust your synthesizer to sound like a bass and play an accompaniment onto track 2. With your "rhythm section" in place you could

Figure 1



A typical system hook up is shown in figure 1. Note that synth A is the master synth because both its MIDI IN and MIDI OUT are connected to the MIDIMATE interface box.

then start layering all sorts of interesting synthesized sounds on top to make melodies and harmonies in the rest of the available tracks.

STUDIO IN A BOX

Once you were finished, you would have a fully edited arrangement for MIDI instruments which you could then record on tape for combination with vocals or non-MIDI instruments. The length of the music you could save would depend somewhat on how many notes were in the piece. The limit per file is 3,000 sequenced notes.

By the way, usually you can simultaneously call up more than one track from a single MIDI instrument. Many synthesizers could give you as much as 8 simultaneous tracks.

On the whole, the MIDITRACK II documentation is excellent. Once you have plugged everything in, the

manual suggests that you simply press your Atari spacebar, play something on your synthesizer, and then press the spacebar again. That's all it takes for a recording and playback!

One of our testers kept losing his music at first, every time he tried to save a track. But once he figured out that this was caused by holding down the Inverse Video key too long during the save command, there were no problems.

MIDITRACK II is designed to operate like a professional multitrack tape recorder. So it contains all the features you would normally expect to find in a recording studio. All 16 tracks are independent unless you mix them together. You can synchronize tracks or change the speed of the entire recording. You can overdub or transpose tracks. You can automatically locate any spot on the recording. You can "punch in" anywhere to record difficult passages one note at a time.

MIDITRACK II even supports the advanced technique of quantization, or autocorrect. For example, if your timing was a bit uneven when you were trying to play that flashy bass part you could set the notes to automatically come out on the beat.

3. CASIO CZ-101

Most Atari owners who buy MIDITRACK II will probably decide to use the new Casio CZ-101 synthesizer as their primary keyboard. That's because the CZ-101 sells for about one-fourth the price of any comparable synthesizer! It lists for \$499 but has been on sale at Macy's for as low as \$300.

The instruments that Bob Moore brought along to demonstrate MIDITRACK II were the Yamaha DX7 synthesizer which has a list price of \$1,995 and the Yamaha RXII drum machine which lists for \$895. Both of these instruments are very popular with professional musicians and are not considered unusually high-priced in comparison to the competition.

At the time, Moore told *Antic* that

a new low-priced but powerful synthesizer from Casio was due to be released shortly and it would apparently be at least somewhat comparable with the DX7. Well, the CZ-101 was shown at the Consumer Electronics Show and Casio kindly let us have one to use with our MIDITRACK II.

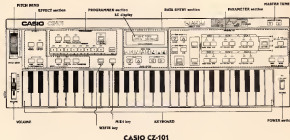
ST OF SYNTHS

We swiftly discovered that the CZ-101 is considerably more than merely a stripped-down version of the DX7. In fact, this Casio could almost be considered the Atari ST of synthesizers—it delivers far more “power without the price” than anything else in its class. Despite the Casio brandname we are talking about a real synthesizer here, not an “electronic music-maker” with one-key chords and preset drum-bass patterns. (It doesn't have a built-in speaker either.)

has more waveforms, envelopes, oscillators and more ways to combine these soundmaking elements than most previous synthesizers.

multitrack compositions featuring your own synthesized sounds almost as soon as you've got your system cabled together.

Figure 3



In this instrument you'll find a full assortment of standard high-end synthesizer features such as pitch-bend wheel, ring modulator, portamento, octave shift, detune control, phase distortion sound generator.

And you can dramatically change the synthesizer voicings during playback and hear your new sounds in real time. Or if you tinker with the playback of the demonstration songs provided with MIDITRACK II you can try out sounds as unique as a Mozart Sonata being played on a vibraphone or jazz organ.

So tune up your Atari and unlock your creativity. With MIDITRACK II, the Casio CZ-101 and Virtuoso, you might very well be world's next musical genius!

16 INSTRUMENTS

The CZ-101 starts you off with 32 factory-preset sounds—flute, electric piano, violins, organ, etc.—that range from okay to pretty good. You can reprogram 16 of these sound “patches” to hold your own sound creations (you can bring back the factory patches anytime). Also there's a slot for additional 16-patch programmable cartridges.

People who play piano by ear and can only play in one key (usually either all white notes or all black notes) will deeply appreciate the transpose button that will instantly shift you into even the most complex key (four flats, five sharps, etc.).

The CZ-101 has 49 keys of standard “mini-keyboard” size. Purists may insist that only full-size keys will do, but personally I enjoy the feeling of spanning left-hand tenths as effortlessly as I would reach octaves on a full-size keyboard.

A GREAT TEAM

The CZ-101 works in combination with MIDITRACK II remarkably effectively. You don't need to be a musical genius to record and playback flashy

MANUFACTURERS

MIDITRACK II
Hybrid Arts
P.O. Box 480845
Los Angeles, CA 90048
(818) 508-7443
\$349—48K disk

CZ-101 SYNTHESIZER
Casio, Inc.
15 Gardner Road
Fairfield, NJ 07006
(201) 575-7400
\$499 (Suggested list)

VIRTUOSO
Enhanced Technology Associates
125 W. Duke Ellington Blvd.
New York, NY 10025
\$50—48K disk
\$150—MIDI interface
(Available August 1985 or later)



Fig 2 shows an example of an envelope using all 8 steps. In this example, there are two attacks before the Sustain Point as well as a third attack after releasing the keys. This shows how you even have the possibility of setting an “after-envelope”.

In many ways the CZ-101 is even more versatile than earlier, more costly synthesizers. A review in the March, 1985 issue of “Keyboard,” the top magazine for electronic keyboard players, concludes, “The CZ-101 makes good use of the latest digital technology. Its attractive features include seven excellent envelope generators, good-sounding waveforms, and several doubling modes for building up complex timbres. As an inexpensive and versatile MIDI slave module, it could be a very effective addition to almost any stack.”

Upon translation from synthesizer jargon, what this means is that the CZ-101's strongest point is its wide-ranging capability of creating and manipulating synthesized sounds. It



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GUITAR TUTOR

Learn and play guitar chords on your Atari

by FRANK IMBURGIO and GRACE BARRY



A program that diagrams and plays simulated guitar chords. The BASIC listing works on all Atari computers of any memory configuration.

My great new Program In The Works wasn't working at all. Rather than break my new 800XL, (which was a serious consideration at this point), I reached for my guitar. I played a song or two while staring at the screen, and the idea for Guitar Tutor was born. Why not create a program to generate, diagram, and play guitar chords: major, minor, seventh and minor seventh chord combinations?

To use the program, first type in the BASIC listing. Check it with TYPO, and save an extra copy as a backup.

A music background is not necessary to understand or play with "Tutor"! The first thing you will see is "Pick a note to build a chord on." Take your pick from the list given, A through G. Then you will be asked to pick a natural, flat, or sharp. After you do that, you can pick whether you want your chord to be a major, minor, seventh, or minor seventh.

Now the screen will diagram the chord for you! These are standard guitar chord diagrams used in music books. Vertical lines represent the six strings of the guitar. Horizontal strings represent the frets. Dots represent where you press your fingers. X's represent strings that are not strummed, and O's represent strings that are strummed "open", with no finger pressing on the string. If two dots are on the same fret, "bar" with your finger—press more than one string down with the flat of your finger.

If you press "S" at this point, you will hear the four individual tones which make up the chord you have chosen. To the right of the diagram you will see a vertical line of eight numbers, the eighth reading REST. By pressing a number from one through seven, you can put the chord on the screen into a "memory." Now press [P] and you can play your chords by

continued on next page

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pressing the numbers you have assigned them. Play chords in any order and of any duration you want! Press [8] and you get no sound.

So as you see, you can also use Guitar Tutor to play a simple chord accompaniment if you feel like taking a break to sing a song while you're programming.

GUITAR TUTOR VARIABLE LIST

TOPS

BOTS

STRINGS

FRETS Graphic patterns to draw

box

PATTERN(20)—Array holds DATA

line numbers and is later used for sound numbers

K—value returned from keyboard
X—GOSUB 600 returns with X as a DATA line number

TONIC—adjusted note (i.e., B[♭] reads data from C natural)

ACC—Accidental: 0 if natural, 1 if flat, 2 if sharp

CHORD—0 if major, 1 if minor, 2 if seventh, 3 if minor seventh

LINE—saves line number to get sound numbers from

F—counting loop

A—current data

FRET—vertical position while writing dots

I—counting loop

TIME—loop to allow notes to sound individually

TONES(63)—array holds sound numbers and names in seven chord "memory"

TONE—current location in the array TONES

ONE—root of chord being put into "memory"

THREE—major third of chord being put into "memory"

FIVE—major fifth of chord

SEV—seventh of chord

MINTHREE—minor third of chord

Frank Imburgio and Grace Barry are the founders of Homespun Software in Setauket, New York. The company's stated aim is to produce home applications software that is easy to use, but not limited by its easiness.

Listing on page 59



the Musician

Type-in "music construction" software

by
ANGELO
GIAMBRA

Powerful and versatile "music construction" program. You can easily compose songs with three-part chord backgrounds—or simply copy the notes and chord symbols from sheet music. This BASIC program runs on any Atari computer with 32K memory. Disk or cassette.

With The Musician, you can easily enter and hear playback of any song on your Atari—with a full background of three-part chords. Only an elementary knowledge of music is required. In fact, you can simply copy your favorite songs directly from sheet music. You set The Musician to play harmony chords by simply naming them—the program fills in the required notes!

Type in Listing 1, checking it with **TYPE** II and **SAVE** it to either cassette or disk. Antic Disk subscribers will find a short demonstration song

bonus file. Here's how to use The Musician.

USING MUSICIAN

When you **RUN** The Musician, you will see an introductory screen for a few seconds as the program initializes. A music staff will then appear on the screen with a single red note.

Use your joystick to move the note up and down on the staff. If you are working from sheet music, simply place the note in the same position you see it on the sheet music. To enter the note, press the joystick button. The note will turn white. Then The Musician will briefly play your chosen note and a new red note will appear.

TIMED NOTES

Placing your note on the staff just gives you the basic pitch. You must still set time values, indicate if a note is sharp or flat, and enter rests or dotted and sustained notes.

You select these various note types by pressing keys on the Atari. Here is

how it works.

Whole notes	W
Half notes	H
Quarter notes	Q
Eighth notes	8
Sixteenth notes	6
Thirty-second notes	3
Dotted notes	.
Sustained notes	S
Sharp notes	#
Flatted notes	B
Natural notes	N
Rests	R

A little music information here: There are various "time signatures" possible at the start of a piece of music. In the most common types, $4/4$ (standard) and $3/4$ (waltz), a quarter note would be held for one beat, half note is two beats and whole note is four beats. An eighth note is half a beat, sixteenth note is one-fourth of a beat and a thirty-second note is one-eighth of a beat.

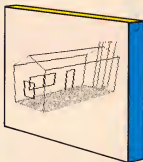
Dotted notes increase the time a note is held by half its normal value.

continued on page 50

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images in ACTION!

by PAUL CHABOT



requires ACTION! cartridge, disk drive and 48K memory. Antic disk subscribers can run VIEW3D.EXE without the ACTION! cartridge. Disable BASIC and use the L option from DOS 2.05. Disk or cassette.



Create 3-D wire-frame outline pictures in your Atari's highest resolutions, Graphics 8 and Graphics 7+. Magnify, shrink, rotate, and otherwise shift your view of the 3-D picture easily and fairly quickly. Re-

When Paul submitted View 3-D to Antic, we saw it was easily the largest ACTION! program any magazine had considered publishing. But in recent months, we have received so many letters from readers wanting ACTION! that we thought it was time for a monster example of programming in this powerful Atari language.

Be warned: there are ten separate program listings, nine of which are dependent on and INCLUDED into the tenth to form one main program. Because of the nature of ACTION! there is no TYPO II, so type patiently and carefully. The results will be well worth it. —ANTIC ED

There are different approaches to 3-D viewing. You can leave the viewing point ("eye") fixed and rotate the object. Or you can think of the object as fixed and change the location of the eye. These are mathematically equivalent, but conceptually quite different to most people.

Also, should the projection be perspective or orthogonal? Where should the focus be placed? View 3-D will allow any combination of these variations and more. To manipulate a 3-D frame quickly, you need faster number crunching than BASIC: pro-

gram 78M and MISCL. This third program, when compiled, will compile the first two, and so on.

VIEW3D is too large to be compiled and run from the ACTION! editor. When all your files are properly typed in, clear the editor and, from the monitor, type: C: "VIEW3D.ACT". After the compilation is complete, type [R] and away you go.

THE PROGRAM

The first thing you should see is the menu screen. View 3-D alternates between two screens—the *menu* screen and the *view* screen. The menu screen

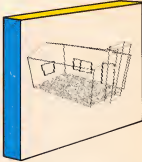
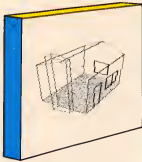
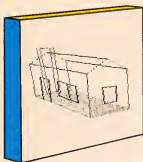
screen. One-key commands are acted upon immediately. No [RETURN] is needed.

[B] Returns you to the menu at any time.

[G] Switches you between GR. 7+ and GR. 8. GR. 7+ offers four colors (counting the background), changed with the [C] selection (below).

[C] Alters the GR. 7+ color registers. The message line at the bottom will indicate the current color number (0-3), its current hue and luminence values, plus the word Default.

The keys [C], [H], [L] increment the



vides. The answer is ACTION!, the cartridge-based programming language from Optimized Systems Software, which is becoming increasingly popular with serious Atari programmers.

TYPING IT IN

View 3-D is one program, but it has been split into ten files. Listing 10, called VIEW3D, is the main file which INCLUDES the other nine. If you look at the beginning of listing 10, you can see the name of the other files.

Type each file in the order they are INCLUDED in Listing 10. Each subsequent file shares procedures from previous ones, none may be compiled or run independently. You can partially check your work by compiling programs accumulatively in the order in which you type them. For example, GR78M may be compiled alone. After typing in MISCL, create a temporary third program which INCLUDES

has command options and a disk directory. The view screen shows your 3D drawing. Shortly after the menu appears, the colors will alter and the program will switch to the view screen and display a simple 3-D object called "Plane" which is similar to Figure 1.

THE COMMANDS

With the exception of [D], any key pressed will take you to the view

color, hue, and luminence. This can be used while in GR. 8. But the effect may be misleading because the GR. 7+ registers and the current screen registers are being altered but not the GR. 8 default values. The [D] key resets all GR. 7+ registers to default values. These values are updated each time you load a data file. Also, none of your playing will affect the menu screen colors, since these are main-

continued on next page

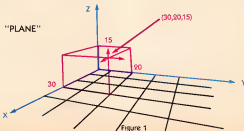


Figure 1

tained separately. Any other key terminates this routine.

[M] Magnifies the object. This is initially set at 4 and wraps to 1 when incremented past 9. You won't see the effect until the picture is redrawn by pressing [SPACE].

[V] Changes the view between perspective and orthogonal. Perspective, which emulates our vision, takes into account the distance from the eye, whereas orthogonal is used in drafting and engineering.

Figures 2 and 3 show the difference between perspective and orthogonal projections.

PREROTATE

These selections let you rotate your object about any of the three X, Y and Z axes. The message line shows the values of rx (rotate X), ry (rotate Y), rz (rotate Z), and ri (rotational increment). Each time the [X], [Y] or [Z] keys are pressed, the object rotates about the chosen axis in ri increments. The rotations are about axes that pass through the focus point.

The [I]/[J] keys increment/decrement the value of ri in degrees. Negative values of ri make rotations go in the opposite direction.

POINT OF VIEW

The following commands affect your dimensional view of the object.

[3] Fix EYE/dist. The eye coordinates are controlled by your joystick. Selections [1]-[4] use the same joystick scheme. Left/right alters the X coordinate, up/down alters the Y, and up/down while holding the trigger alters the Z. In selection [3], left/right with the trigger pressed controls the distance. Press [SPACE] to draw your object from this new eye location.

Remember that the eye coordinates are relative to the focus point (see [4] below) and only establish the viewing direction in the orthogonal view. The eye-object distance is important only in the perspective view. Keep the distance large to avoid distortion.

[4] Change FOCUS. The focus is the point in space at which the eye is aimed and through which all the rotation axes pass. It is normally on or near

the object being studied and will be mapped to center screen (cx,cy). Move the flashing dot with your joystick. More importantly, watch its coordinates. Use [SPACE] to set your choice.

[5] Change CENTER. This alters cx and cy, shifting the object. These are actual screen coordinates (0,0 is the upper left). Use [SPACE] to set your choice and see the effect.

[0] Resets the center, eye, focus, magnification, and prerotation values to defaults used at start-up.

I/O

[D] Lists up to 22 data files in the menu window, assuming they have "V3D" extenders. This is also done automatically at start-up and after each successful save.

[L] Loads a data file from disk. Answer the input prompt with a filename only. The program supplies the "D:" prefix and a "V3D" extender. Upon hitting [RETURN] you'll see the full filespec. Press [L] again to accomplish the load. Any other key will abort the process.

[S] Saves data to a disk file. The process is the same as the above [L] load.

[P] Outputs to your printer. After pressing [P] you may choose to print the picture data [D] or the picture [P]. The picture is produced by a short screen dump for a Gemini 10X. You'll get best results by printing the GR. 8 picture.

To alter the printout procedure for your own printer, examine the **Print** procedure in the **PRINTIO.ACT** file and adapt accordingly. The **st** array contains printer control codes 26, 51, 16 which, on the Gemini, set the line feed to 16/144 inches. In the **pre** array, the 27, 75, 192, 0 mean print normal-density graphics (60 dots/inch) using 192+256*0 characters. If you have an Epson FX-80, for example, you need only change the line feed commands: Change the 16 to 24 in the **st** array, and later in the procedure at **st(3)=16**. Also, change the 20 to 30 in **st(3)=20**.

3-D DRAWING

It's not easy to draw in 3 dimensions. The easiest way to learn is simply to

try it. Concentrating on the changing coordinates in the message line may be easier than watching the dots and lines on the screen.

However, before you start, you may wish to save the object currently in memory. The process is easier to understand if you use the **EDIT** command, [2], to display a blank screen. Each time you press the [SPACE] bar, the screen will step through the drawing process of the object in memory, showing you how to construct a drawing.

To get started on your own, press [0] to use default values. To create a blank screen, press [2] then [1]. The joystick moves a flashing dot, whose coordinates appear in the bottom line. Position the cursor where you want it, and establish that point by pressing the [SPACE] bar. Your current updated point number will be displayed in the bottom line. Next, move the cursor to your second location, press [P] to switch from "Plot" to "Line/0" and press [SPACE] to draw the line.

For starters, keep it simple, or try editing a sample drawing. (The program can take up to 200 data points.) To edit a previous drawing, press [1] to ADD points and lines. As you step through the drawing by pressing [SPACE], you can change any of the values at any point, or you can begin adding to the last points. You can, of course, save your object to disk at any time.

DATA STORAGE

At this point, you need to understand a little about how data for your 3-D object is stored. The **INTEGER** array **P** contains all the information in the following format:

$$P = [n: x y z: d: x y z: c: \dots : x y z: c: \dots]$$

P(0)=n is the number of data points in your object. The next four integers contain **EYE** data. The first three indicate the direction away from the **FOCUS**, and the fourth gives the distance.

The following four integers contain the three space coordinates of the focus point and a presently unused

value. These nine integers are followed by n data sets for your object. Each is made up of four integers containing the three space coordinates for a point and a fourth coded message. The encoding of the fourth integer is given by $c = \text{color} + 16 * p$, where $p = 0$ for "Line0" and $p = 1$ for "Plot".

SAMPLE DATA

You can enter the data in figure 4 in the ADD mode to create a house with windows and a red chimney. Press [2], then [1] to clear memory. Now use your joystick to get the coordinates in the message line to match those of the first point in the example. Hit [C] and [P] as needed and set the data by hitting [SPACE]. Now do the same for the second point in the example, etc.

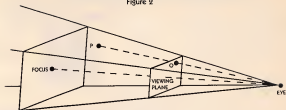
You can even do a little at a time. Just save the portion you've done. Next time load in this file, press [1] and continue from where you left off. A couple of examples will show you how to read the notation. "10 20 15 P2" means to Plot (10,20,15) in color 2. Whereas "20 20 30:L3" denotes a color 3 Line0 (20,20,30). Each example has suggested EYE and FOCUS data.

Longtime Antic contributor Paul Chabot is a professor of mathematics and computer science at California State University, Los Angeles. He wrote "Splash In ACTION!" in our April 1985 issue.

Listing on page 34

PERSPECTIVE PROJECTION

Figure 2



ORTHOGONAL PROJECTION

Figure 3

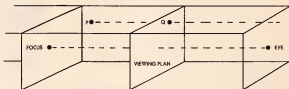


Figure 4

```
HOUSE : eye=(10 3 5:160) focus=(15 30 20)
(0 0 0:P2)      (30 0 0:L2)      (30 60 0:L2)
(0 60 0:L2)     (0 0 0:L2)       (0 0 40:L2)
(15 0 50:L2)    (30 0 40:L2)     (30 0 0:L2)
(30 60 0:P2)    (30 60 40:L2)    (15 60 50:L2)
(0 60 40:L2)    (0 60 0:L2)      (0 60 40:P3)
(0 0 40:L3)     (30 0 40:P3)     (30 60 40:L3)
(15 60 50:P2)   (15 0 50:L2)     (30 10 0:P3)
(30 10 25:L3)   (30 20 25:L3)    (30 20 0:L3)
(30 30 10:P3)   (30 30 25:L3)    (30 50 25:L3)
(30 50 10:L3)   (30 30 10:L3)    (30 40 10:P3)
(30 40 25:L3)   (10 60 10:P3)    (10 60 25:L3)
(20 60 25:L3)   (20 60 10:L3)    (10 60 10:L3)
(10 0 0:P1)     (10 -5 0:L1)     (20 -5 0:L1)
(20 0 0:L1)     (20 0 55:L1)     (20 -5 55:L1)
(20 -5 0:L1)    (10 0 0:P1)     (10 0 55:L1)
(10 -5 55:L1)   (10 -5 0:L1)     (10 0 55:P1)
(20 0 55:L1)    (10 -5 55:P1)    (10 -5 55:L1)
```


TURBO TYPO II

Speedy three-line enhancement

by DAVID McLAUGHLIN

Changing three lines in TYPO II gives assembly language speed to Antic's program typing checker. (See Listing Section.) TURBO TYPO II will work on all Atari computers of any memory configuration.

When Andy Barton started working on TYPO II, he wrote it as a machine language vertical blank interrupt routine which fit in Page Six of memory. Following a suggestion from Bill Wilkinson of Optimized Systems Software—who wrote the original TYPO—we decided to switch to an all-BASIC TYPO II. Antic felt that novices, who most needed TYPO II, would have a much easier time if they didn't have to type in a lot of data statements.

We also wanted a simple program that the widest range of readers could have fun tinkering with. (See the I/O pages in both the April and May issues for some earlier enhancements.) Judging by the many thank-you letters from new Atari users and the large number of improvements that more experienced readers have sent in, Antic certainly succeeded in both goals.—ANTIC ED

TURBO TYPO II

TYPO II is an enormous help, but it does have an annoying drawback—the longer the line, the more time required to check it. My object was to

speed up TYPO II while producing the same two-letter code checksums.

I noticed the slowdown came from line 32150 of the original code. This line was an elegant solution, creating a unique code that also checks for correct letter order (i.e. distinguishes between TO and OT).

Therefore, the best way to speed up TYPO II was to write the line 32150 procedure in machine language. Thus, I created Listing 3, TYPO II, in ML. But you do NOT need to type this listing to create an enhanced TYPO II. It is included primarily for your information.

TWO CHOICES

I have provided two ways to create the necessary enhancements. Listing 1 is all you need to add to the current TYPO II. If you are one of those brave souls who doesn't mind typing in a lot of special and inverse characters then simply use your old TYPO II to type in Listing 1. When done, press [BREAK] then SAVE or LIST your enhanced TYPO II to disk or cassette.

If you'd rather not take a chance on typing tricky characters, then use your old TYPO II and follow these instructions in exactly the following order.

1. With TYPO II running, type in lines 32015 to 32025 from Listing 1.
2. Type in Listing 2.

3. After Listing 2 is successfully entered, press [BREAK] to stop TYPO II.
4. Type RUN and line 32026 from Listing 1 will be created for you.
5. When the READY prompt appears type GOTO 32000.
6. Type in line 32150 from Listing 1 and your enhanced TYPO II is complete.
7. Press [BREAK] and save the new TYPO II to disk or tape by typing:

LIST "D:TYPO II",32000,32220 or
LIST "C:",32000,32220.

If you want a SAVED version then type NEW and then ENTER the new, enhanced TYPO II and then SAVE it to disk or tape.

SOURCE CODE

Listing 3 was created with the Atari Assembler/Editor cartridge. Of greatest interest is the use of three bytes to calculate TYPO II's variable ANS.

Normally, in this type of application, the programmer returns the value of ANS back to BASIC through memory locations 212 and 213 (hexadecimal \$D4 and \$D5) as the Atari creators originally planned. However, ANS can only have a maximum value of 65535, the greatest value two bytes can hold.

continued on next page

assembly language

The original TYPO II's design allows ANS to become larger than that after the length of LINE\$ becomes greater than about 20-30 characters. But the use of three-byte arithmetic is sufficient to hold the highest possible values of ANS.

A note of caution: TYPO II in ML uses three Page Six memory locations, 1789-1791 (hexadecimal \$6FD-\$6FF). Any program that accesses these three locations will be in conflict with the enhanced TYPO II. But since they are the last three locations on Page Six, there should be little problem.

Listing on page 75



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G.U.P. the GREAT

*Fast graphics
power from BASIC*

by DAREK MIHOCA

Graphics Utility Package (G.U.P.) is a BASIC program that creates a boot file. When this file is installed in your Atari's memory several new and powerful graphics commands are available to you in the form of USR calls.

G.U.P. features include:

- PLOT and DRAWTO about 3-5 times faster than normal.
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TYPING G.U.P.

Type in Listings 1 and 2. Check them carefully with TYPO II and make sure no lines have been missed. These programs use machine language routines which could lock up your computer if mistyped, so be sure to SAVE backup copies before RUNning them.

Listing 1 will create an AUTO-RUN.SYS file on disk. RUN the program and at the prompt insert a formatted disk with DOS 2.0S, press START and G.U.P. will be written to disk. (Note: because of the G.U.P. file structure, do NOT use DOS 3.). Now,

continued on next page

boot the disk, the screen will change color and G.U.P. will be in memory.

DEMONSTRATION

To test G.U.P., LOAD Listing 2 into memory and RUN it. Listing 2 is a demonstration program that will take G.U.P. through its amazing paces and provide examples of how to use G.U.P. in your own BASIC programs.

Lines 40-180 of Listing 2 are essential to any BASIC program using the G.U.P. commands. These lines determine the starting locations of the different routines and store them in command variables. You can remember them for your convenience, but they must be executed before any G.U.P. commands are given.

LOCK-UP

G.U.P. is really a series of USR calls, which are assembly language routines

that are accessed from BASIC. Computer newcomers, who may be a little wary of USR routines should read last month's "USR Routines" by Ernie Negus.

When using assembly language routines, there is always a good possibility of computer lock-up—your keyboard no longer responds and there's nothing to do but turn off your computer and start all over again. Lock-ups can occur with just one mistyped character. They're time-consuming and annoying and you may lose unsaved data. But they won't harm your machine, so don't be afraid to experiment.

G.U.P. COMMANDS

G.U.P. has 10 separate commands: GRAPHICS, SET, PLOT, DRAWTO,

LINE, BOX, CIRCLE, TEXT, RANDOM, and CI28. Here is a description of each:

GRAPHICS x—Establish graphics mode. Any one of the 16 graphics modes can be selected. This allows a ROM B Atari to access the 4 new ROM C graphics modes with one command. To access the 160X192 4 color mode (GR.15 on XL computers), use the command:

```
A = USR(GRAPHICS,15)
```

SET a,b,c,d—Choose patterns. Each parameter contains color data for 4 pixels necessary for the pattern of colors. (See the explanation later on.) To set the colors to simulate the BASIC command COLOR 1, use:

```
A = USR(SET,85,85,85,85)
```

PLOT x,y—Same as BASIC's PLOT. Use:

```
A = USR(PLOT,X,Y)
```

DRAWTO x,y—Again, the same as BASIC's DRAWTO. Use:

```
A = USR(DRAWTO,X,Y)
```

LINE x1,y1,x2,y2—Similar to DRAWTO, except that the first parameter is the starting pixel. For example, to draw lines from pixel 0,0 to 10,5 to 20,3 use:

```
A = USR(LINE,0,0,10,5,20,3)
```

The DRAWTO and LINE commands can have more than one parameter.

That is, if 5 pairs of coordinates are given, then a line will be drawn from the first to the second, then the second to third, and so on. This saves time and memory.

BOX x1,y1,x2,y2—This will draw a filled-in box whose opposite corner coordinates are (x1,y1) and (x2,y2). A 10 pixel square box is draw with:

```
A = USR(BOX,0,0,10,10)
```

CIRCLE x,y,r—this draws a circle of radius r pixels at location x1, y1. This command works about 30 times faster than any BASIC algorithm I've tried. A large circle in GR.15 is drawn by:

```
A = USR(CIRCLE,79,79,75)
```

TEXT x,y,"abcd..."—this will print out the given string of length l in graphics modes 4,6 or 8 at coordinates x,y. This allows easy mixing of text and graphics. It should be used in a 2 color mode to make the letters readable. To put the word ANTIC in the upper left corner of the screen use:

```
A = USR(TEXT,0,0,ADR  
("ANTIC"),5)
```

Repeating the command will erase the word and restore any graphics that were underneath.

RANDOM—This command simply puts random colors in the color pattern. The command is:

```
A = USR(RANDOM)
```

CI28 d,r—This produces a 128 color rainbow display for the given duration (d in 1/60ths of a second) in the given color register (r). R is determined by subtracting 704 from the location of the color register. For example, to make a rainbow of the background (location 710) for 10 seconds use:

```
A = USR(CI28,600,6)
```

VARIABLE REGISTERS

Four variables are established as registers in G.U.P.

CIRF is a variable used to switch between empty-circle drawing and filled circles. POKE CIRF,0 for empty

circles or POKE CIRE,1 for filled ones.

Memory location 208 is used with the command GRAPHICS. Since G.U.P. can only plot up to a co-ordinate of 255,191, the co-ordinates from 256,191 to 319,191 in graphics mode 8 cannot normally be accessed. By poking an 8 into 208, the co-ordinate plane is shifted over 64 pixels and A=USR(PLOT,0,0) would actually plot at 64,0.

The memory locations SETCOLOR

to SETCOLOR+8 are values that are copied into memory locations 704 to 712 when a GRAPHICS command is executed. By poking into these locations, the default colors of the screen can be changed, as they already are in G.U.P. For example, in graphics mode 0, to change the screen color to black, a POKE 710,0 is run. To set G.U.P. to make the screen black every time a GRAPHICS command is given, do a POKE SETCOLOR+6,0 since 710=704+6.

SET COMMAND

One of the best things about G.U.P. is that it doesn't just draw in solid colors. A 1x4, 2x4, 4x4 or 8x4 color pattern is stored at memory locations COLOR to COLOR+3. The size of the

pattern is determined by the graphics mode. This is because text modes use one byte per character, GTIA modes use one byte to display 2 pixels, 4-color modes use one byte for 4 pixels, and the 2-color modes can store 8 pixels in a byte.

The pattern can either be POKED in, or put in with the SET command. This way circles can be drawn in a checkerboard pattern, lines can be dotted, and more.

The formula for determining the parameters to use in the SET command is quite simple. Just like BASIC's COLOR command which selects one of the 4 color registers for plotting, each one of the 4 parameters passed in the SET command determines the color registers for a 4x1 array of pixels in a 4-color mode, 8x1 in a 2 color mode, 2x1 in a GTIA mode.

Using 2-color modes 4, 6 and 8, an 8x4 pattern can be set up. This means that during PLOT, DRAWTO, LINE, BOX, or CIRCLE, the pixels will be plotted so that if the whole screen is filled up it will be made up of little 8x4 boxes of the same pattern. By making the pixels alternate from black to white, a very fine checkerboard pattern is made as follows: Let 0 represent a pixel in color 0 and a 1 represent a pixel in color 1. The pattern is therefore

```
01010101
10101010
01010101
10101010
```

This pattern represents 4 binary numbers. In decimal they are 85, 170, 85 and 170. Therefore the command to give is:

```
A=USR(SET,85,170,85,170)
```

If you just want to plot with color 1, the whole pattern would be 1's and the four numbers would each be 255 (11111111 in binary). Similarly, if you want to plot with color 0, use the number 0 four times.

In a 4-color mode, 4 colors can be used so each pixel must be represented by two bits: 00, 01, 10 or 11. This is why only 4 can be used in one byte. Similarly, in a GTIA mode, 16 colors are possible, therefore 4 bits are

required per pixel and only 2 pixels fit in one byte.

In a text mode, 0, 1, 2, 12 or 13, the four numbers represent a block of 1x4 characters. Each number is the ATASCII code of the character.

If you wish to POKE these values instead of using the SET command,



locations COLOR to COLOR+3 are where the four parameters of the SET command go and can be POKEd directly.

FEEL FREE

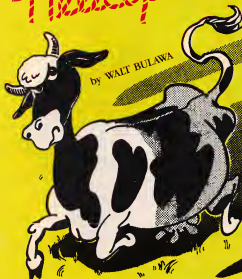
Luckily, you don't really need to understand any of this. Simply try out different numbers in the SET parameters until you see what you like. This holds true of all of G.U.P. Many of these routines may be placed in strings for those more advanced programmers. Feel free to experiment.

Derek Mibocka placed in the top 10 in three nationwide Canadian university math and physics contests. He's a member of the Toronto Atari Federation and a licensed glider pilot.

Listing on page 68



Helicopter Round-up



In Australia there are more men than women and more cows than men. To keep the cows under control, ranchers use helicopters. Your helicopter is supposed to scare the cows into their holding pen.

In case you've never buzzed a bovine with a helicopter before, you'll need some advice. As you maneuver your joystick-controlled copter closer to the herd, the animals get increasingly skittish and move away from you. Steering helpers into a corral isn't easy.

While patiently waiting for you to get airborne, the cows move randomly. Then after all of the cattle have been packed into their pen, the gate will close. You must return the copter to the landing pad for a full score.

But if you run out of fuel, your helicopter will crash and kill some innocent cows.

USING THE PROGRAM

To get this game off the ground, type in Listing 1, check it with TYPO II, and SAVE a copy. When you RUN Helicopter Roundup, you'll have to wait while the screen blanks for initialization (don't panic). Then you'll see the game.

You can [SELECT] the number of cows to herd, and you can refuse during play by positioning the copter over the landing pad and pushing the joystick trigger.

The game continues indefinitely until all cows are controlled or you crash.

When he's not rounding up redefined cow characters, Walt Bulawa is an application programmer for the medical field.

Listing on page 71



Cows? Helicopters? In your Atari? You bet! This BASIC action game challenges you to round 'em up from the air. Works on all Atari computers of any memory configuration. Disk or cassette.





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- | | | |
|-----------|--|---|
| FEATURES: | 1. Backup protected disks | 5. AFSD-Automata FUZZY Sector Discriminator |
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REQUIREMENTS: The "IMPOSSIBLE" diskette, the 4K STATIC RAM pack, a 400 or 800 computer (please specify) with 48K and "B" Rom's. NOTE! The very old Atari computers were shipped with "A" Rom's which had some serious "bugs". Even if you don't own an "IMPOSSIBLE", you should upgrade to "B" Rom's (simple to install) We have them available at a very inexpensive price. CALL US "XII" version available soon!

NOTE FRASLING TOOL: We at C.S.S.D. did not design THE "IMPOSSIBLE" to put Software Manufacturers out of business overnight! Nearly all of our products have been "tried-off" by industry parasite who have little or no ability to develop a product of their own so we can sympathize with their dilemma. All C.S.S. products have built in safety guards which prohibit their use for flagrant pirating. The "IMPOSSIBLE" is no exception! While the "IMPOSSIBLE" backup the most heavily protected programs, it also checks to see that the 4K STATIC RAM pack is installed before allowing the backup copy to execute!

EXAMPLES: The "IMPOSSIBLE" has been tested on 300 of the most popular and heavily protected programs we could find. With nearly 4000 programs for Atari, we DO NOT guarantee that it will backup all programs in the past-present-and-future! We will supply updates of \$6 each (non-profit) if and when necessary. Programs we have successfully backed up include: Blue Max, Ws-cad, Archon, Mule, File Manager 800 +, Syn Calc, Syn File, One on One, 7 Cities of Gold, Super Bunny, Lord Runner, Drol, and Gumball just to name a few!

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A dotted half note gets held for three beats of a measure. Sustained notes slide into the note which follows them instead of playing as separate notes.

To choose a dotted, sustained eighth note, you would press the following three keys—[.] [8] [S]. The Musician isn't fussy. You may press keys in any order for a multiple-key note command.

When you use the [F] or [B] to make sharps or flats, The Musician will stay in the sharp or flat mode until you press [N] for Natural.

Rests are times when no note is played. To choose a quarter rest, first press [Q] to make a quarter note, then press [R] to make it a rest. Similarly, to make an eighth rest, press [8] [R]. Half rests are [H] [R].

Once you have selected the correct type of note and placed it in the right position on the staff, press your joystick button to enter it.

Press [C] to Cancel the note if you change your mind. [C] always cancels the last note or the last chord entered.

ENTERING CHORDS

The Musician will recognize even the most advanced kinds of chords. Entering chords is a snap since you enter them by name, not by notes. Press the asterisk [*] key to tell The Musician you want to enter a chord. The Musician will display:

ENTER A CHORD
THEN PRESS RETURN

To enter a C chord, press [*] followed by [C], then press [RETURN]. The Musician will display the name of the chord you have keyed in, and briefly play the chord.

Using the Key of C as an example, here is a complete list of chord types recognized by The Musician.

ENTER	CHORD SELECTED
C	C major
CM	C minor
CM7	C minor seventh
C7	C seventh
CM6	C minor sixth
C6	C sixth

CMAJ	C major seventh
C+	C augmented fifth
C-	C diminished fifth
CD	C diminished

Sharp and flat chords are entered by adding the [F] or [B] keys. For instance, here's how to enter a C sharp minor seventh chord:

Press [*]
Press [C]
Press [F]
Press [M]
Press [7]
Press [RETURN]

Chords in other keys are entered in exactly the same manner. For instance, you enter a G seventh as G7.

If a chord is to play simultaneously with a certain note, enter the chord first, then enter the note.

If you make a mistake when entering a chord and wish to exit from chord mode, simply press [*] again. The chord will not be entered and you will return to note entry mode again. To re-enter the chord, press [*] again.

Chords will continue to play in the background until they are changed to something else or turned off. To turn off a background chord, press [O]. The Musician will display: CHORD OFF

SONG PLAYBACK

To hear a playback of the song you have entered, press [P]. The song will play automatically and each note will appear on the staff as it plays. You may change the tempo of the song by pressing [T] before pressing [P]. The Musician will display:

CHANGE TEMPO SLOWER

Press the joystick button to slow down the tempo. To speed up the tempo, first move the joystick forward. The word SLOWER will change to FASTER. Pressing the joystick button will then speed up the tempo.

After playing a song, it remains in the computer memory. You may continue adding notes to the end of the song. You may clear it from memory. Or you may SAVE it to cassette or disk.

Pressing [ESC] while a song is play-

ing causes The Musician to immediately stop playing the song and return to note entry mode.

SAVING A SONG

To SAVE a song, press [A] for Archive. The Musician will display:

ENTER SONG NAME

If you are saving to cassette, just press [RETURN]. You will hear two beeps. Put your recorder on record, then press [RETURN].

If you are using disk, type in the song name. Do not use more than eight characters, since this becomes the file name. Three-character extensions are allowed if you like using them. Press [RETURN]. The Musician will write out your song.

LOADING A SONG

To load a previously saved song, press [L]. The Musician will ask you for the name of the song file.

If you are entering the song from cassette, position the tape to the beginning of the song and press [RETURN].

If you are using disk, type in the song name and press [RETURN].

The Musician will load in the song and play it for you. Once a song is loaded it remains in memory until you clear it out. If you add notes after loading a song, they get appended to the end of the song. In this way, you can finish songs you saved only partially completed.

CLEAR AND EXIT

To clear a song from memory, press [CLEAR]. Do NOT use the [SHIFT] key. Now you may begin entering a new song.

To exit The Musician, press [E]. The Musician will display

EXIT Y or N

Press [Y] to confirm your choice. The program will end and return you to BASIC.

Angelo Giambra is a senior programmer for Marine Midland Bank in Rochester, N.Y. His "Eight Queens Problem" appeared in the April, 1984 Antic.

Listing on page 61



SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

► **ROTATE AND VIEW 3-D IMAGE IN ACTION!**

VIEW 3-D 54

► **ENHANCE YOUR PICTURE DETAILS LIKE NASA DOES!**

PIXEL SCANNER 58

► **YOUR ATARI MASTER WEAVER!**

COLOR INKLE LOOM 60

► **"MUSIC CONSTRUCTION" SOFTWARE!**

THE MUSICIAN 61

► **JOYSTICK SELECTION OF PROGRAM HUES!**

COLOR PALETTE 64

► **FAST GRAPHICS POWER FROM BASIC!**

G.U.P. THE GREAT 68

► **LEARN AND PLAY GUITAR CHORDS ON YOUR ATARI!**

GUITAR TUTOR 69

► **GAME OF THE MONTH**

HELICOPTER ROUND-UP 71

► **LOGO**

TURTLE PIANO 74

► **ASSEMBLY LANGUAGE**

TURBO TYPO II 75

TYPING SPECIAL ATARI CHARACTERS 52

HOW TO USE TYPO II 53 ERROR FILE 53

DISK SUBSCRIBERS: You can use all these programs immediately.

Just follow the instructions in the accompanying magazine articles.

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Antic program listings are typeset by Star's Gemini 10X Printer—From Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way Antic prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

```

ABCDEFGHIJKLMNPOQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789



```

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below. (Squares are drawn around the normal video characters so you can see their positions more accurately, these squares will not appear in listings.)

NORMAL VIDEO			
FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
☐	CTRL ,	☐	CTRL T
☐	CTRL A	☐	CTRL U
☐	CTRL B	☐	CTRL V
☐	CTRL C	☐	CTRL W
☐	CTRL D	☐	CTRL X
☐	CTRL E	☐	CTRL Y
☐	CTRL F	☐	CTRL Z
☐	CTRL G	☐	ESC ESC
☐	CTRL H	☐	ESC CTRL -
☐	CTRL I	☐	ESC CTRL -
☐	CTRL J	☐	ESC CTRL +
☐	CTRL K	☐	ESC CTRL *
☐	CTRL L	☐	CTRL .
☐	CTRL M	☐	CTRL ;
☐	CTRL N	☐	SHIFT =
☐	CTRL O	☐	ESC
☐	CTRL P	☐	SHIFT
☐	CTRL Q	☐	CLEAR
☐	CTRL R	☐	ESC DELETE
☐	CTRL S	☐	ESC TAB

INVERSE VIDEO			
FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
☐	▲ CTRL ,	☐	▲ CTRL Y
☐	▲ CTRL A	☐	▲ CTRL Z
☐	▲ CTRL B	☐	ESC
☐	▲ CTRL C	☐	SHIFT
☐	▲ CTRL D	☐	DELETE
☐	▲ CTRL E	☐	ESC
☐	▲ CTRL F	☐	SHIFT
☐	▲ CTRL G	☐	INSERT
☐	▲ CTRL H	☐	ESC
☐	▲ CTRL I	☐	CTRL
☐	▲ CTRL J	☐	TAB
☐	▲ CTRL K	☐	ESC
☐	▲ CTRL L	☐	SHIFT
☐	▲ CTRL M	☐	TAB
☐	▲ CTRL N	☐	▲ CTRL .
☐	▲ CTRL O	☐	▲ CTRL ;
☐	▲ CTRL P	☐	▲ SHIFT -
☐	▲ CTRL Q	☐	ESC CTRL 2
☐	▲ CTRL R	☐	ESC
☐	▲ CTRL S	☐	CTRL
☐	▲ CTRL T	☐	DELETE
☐	▲ CTRL U	☐	ESC
☐	▲ CTRL V	☐	CTRL
☐	▲ CTRL W	☐	INSERT
☐	▲ CTRL X		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key  instead.) Note: In the printed listings, inverse characters will be slightly smaller than the normal ones.

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be *thicker* than the alpha-numerics. Compare the two sets of characters below:

SPECIAL

```

/  ☐ CTRL F
\  ☐ CTRL G
-  ☐ CTRL N
-  ☐ CTRL R
+  ☐ CTRL S

```

STANDARD

```

/  ☐ /
\  ☐ SHIFT +
-  ☐ SHIFT -
-  ☐ -
+  ☐ +

```

HOW TO USE TYPO II

Type in TYPO II and SAVE a copy to disk or cassette.

Type GOTO 32000 and follow TYPO II onscreen instructions. If the resulting two-letter line codes are not exactly the same as those in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk (*) followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME", 0,31999 [RETURN] (Cassette owners LIST "C:"). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:"). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

```
NO 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
NS 32020 CLR :DIM LINES(120):CLOSE #2:CLS
SE #3
ON 32030 OPEN #2,4,0,"E":OPEN #5,5,0,"E"
VC 32040 ? "K":POSITION 11,1:? "*****"
EM 32050 TRAP 32040:POSITION 2,3:? "Type
in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2:LINE
#:IF LINES="" THEN POSITION 2,4:LIST B
:GOTO 32060
KH 32070 IF LINES(1,1)="" THEN #VAL(LIN
E$(2,LEN(LINES)):POSITION 2,4:LIST B:
GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 #VAL(LINES):POSITION 1,3:? " ":
NY 32100 POKE #42,13:STOP
CN 32110 POKE #42,12
```

```
ET 32120 ? "K":POSITION 11,1:? "*****"
":POSITION 2,15:LIST B
CE 32130 C#=ANS-C
OR 32140 POSITION 2,16:INPUT #3:LINE$:IF
LINE$="" THEN ? "LINE ":"0:" DELETED0:G
OTO 32050
VV 32150 FOR O=1 TO LEN(LINE$):C=C+1:ANS=
ANS+(C*ASC(LINE$(O,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
OH 32190 LCODE=CODE-(HCODE*26)+65
HO 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE):CHR$
(LCODE)
VG 32220 POSITION 2,15:? "If CODE does no
t match press [F7] and edit line a
bove:"GOTO 32050
```

ERROR FILE

BUS OVERLINES

Some signals and address labels were printed without overlines in Part III of Earl Rice's Parallel Bus Revealed" (Antic, March 1985).

These are the correct labels:

DSXX—DFXX
CS (CHIP RESET)
R/W
DIXX
RDE (READ DATA ENABLE)
DS (DATA STROBE)
DRST (DEVICE RESET)

FIRST LESSON IN ASSEMBLY

Line 100 of the listing for "First Lesson in Assembly Language" (November, 1984) should read POKE 755,4 instead of POKE 775,4.

KOOKY'S QUEST

February '85

The following line is missing:
2100 FOR S=32 TO 16 STEP
-4: SOUND 0,5,14,10: EA=EA
"EA":EA: SOUND 0,0,0,0: EA=1
/O:NEXT S

DRUM SYNTH

February '85

In Figure 1, the "ART" should be the Full (inverse) symbol.

MISSING INFOBITS

DECEMBER '84
The AL source listing for Infobits (Dec. '84) was left out of the previous issue. You'll find it in the Jan. '85 Software Library.

ADVENT X-5

November '84

Missing line: 8020 RUN. Also, cassette owners should change the 138 in line 4005 to 130. The TYPO II code for line 1005 is EJ.

ADVENTURE ISLAND

November '84

Line 837 is missing its last item of data, a 4. Also, it will not run with DOS XL.

VIEW 3-D

Article on page 38

LISTING 1

```

; GR70M (LISTING 1)

MODULE:INT xnow=(00),ynow=(90)
BYTE cnow=(1),key=764,rnm=106,cur=752
BYTE ARRAY mask7={64 16 4 1},clor=700
      ,mask8={128 64 32 16 8 4 2 1},mask,row
CARD dlist={560,50=00}
CARD ARRAY adr(192):CARD POINTER mes

PROC Kolor(BYTE C) RETURN
PROC Dot(INT x,y) RETURN
PROC Bit(INT x,y) RETURN

PROC LineTo(INT x,y)
INT dx,dy,xf,yf,a,b,t,i
Dot(xnow,ynow)
IF x=xnow AND y=ynow THEN RETURN FI
IF x>xnow THEN dx=x-xnow:xf=1
ELSE dx=xnow-x:xf=-1 FI
IF y>ynow THEN dy=y-ynow:yf=1
ELSE dy=ynow-y:yf=-1 FI
x=xnow:y=ynow
IF dx>dy THEN a=dy+dy:t=a-dx:b=t-dx
FOR i=1 TO dx DO x=x+xf
  IF t<0 THEN t==a
  ELSE t==b:y=y+yf
  FI Dot(x,y)
DO
ELSE a=dx+dx:t=a-dy:b=t-dy
FOR i=1 TO dy DO y=y+yf
  IF t<0 THEN t==a
  ELSE t==b:x=x+xf
  FI Dot(x,y)
DO
FI xnow=x:ynow=y:RETURN

PROC Gr70M():BYTE i:BYTE ARRAY d1
Graphics(0+16):adr(0)=5a:d1=dlist
FOR i=1 TO 191 DO adr(i)=adr(i-1)+40 DO
d1==4:d1(0)=132:d1(1)=00:d1(2)=16
FOR i=3 TO 190 DO d1(i)=d1(i+4)
DO d1(199)=16:d1(200)=66:mes=d1+201
d1(204)=d1+1:d1(205)=d1:RETURN

PROC Kolor7(BYTE C):BYTE i
c==A S:cnow=c
FOR i=0 TO 3 DO mask(3-i)=c:c==LSH 2 00
RETURN

PROC Dot7(INT x,y):BYTE xb,xf
BYTE ARRAY pre={63 207 243 252}
IF x<0 OR x>159 THEN RETURN FI
IF y<0 OR y>191 THEN RETURN FI
xb=x RSH 2:xf=x AND 3:row=adr(y)
row(xb)==A pre(xf) X mask(xf):RETURN

PROC Bit7(INT x,y):BYTE xb,xf
IF x<0 OR x>159 THEN RETURN FI
IF y<0 OR y>191 THEN RETURN FI
xb=x RSH 2:xf=x AND 3:row=adr(y)
row(xb)==! mask(xf):RETURN

PROC Gr7(BYTE ARRAY d):BYTE i
mask=mask7:Kolor=Kolor7:Dot=Dot7
Bit=Bit7:d(3)=70:d(99)=70
FOR i=6 TO 90 DO d(i)=14 00

```

```

FOR i=182 TO 190 DO d(i)=14 00:RETURN

PROC Kolor8(BYTE C):BYTE i
cnow=c A 3:IF c>1 THEN c=1 FI
FOR i=0 TO 7 00 mask(7-i)=c:c==LSH 1 00
RETURN

PROC Dot8(INT x,y):BYTE xb,xf
BYTE ARRAY
pre={127 191 223 239 247 251 253 254}
IF x<0 OR x>319 THEN RETURN FI
IF y<0 OR y>191 THEN RETURN FI
xb=x RSH 3:xf=x AND 7:row=adr(y)
row(xb)==A pre(xf) X mask(xf):RETURN

PROC Bit8(INT x,y):BYTE xb,xf
IF x<0 OR x>319 THEN RETURN FI
IF y<0 OR y>191 THEN RETURN FI
xb=x RSH 3:xf=x AND 7:row=adr(y)
row(xb)==! mask(xf):RETURN

PROC Gr8(BYTE ARRAY d):BYTE i
mask=mask8:Kolor=Kolor8:Dot=Dot8
Bit=Bit8:d(3)=79:d(99)=79
FOR i=6 TO 90 DO d(i)=15 00
FOR i=182 TO 190 DO d(i)=15 00:RETURN

```

LISTING 2

```

; MISCI (LISTING 2)

MODULE:BYTE s:INT ARRAY
jx={1 1 1 1 2 2 2 1 0 0 1 1 1 1}
jy={1 1 1 1 2 0 1 2 0 1 1 2 0 1}
BYTE ARRAY b=""

PROC SetJxJy(BYTE i)
FOR i=0 TO 15 DO jx(i)=-1:jy(i)=-1 00
RETURN

PROC Pb(BYTE i):b(0)=i:Print(b):RETURN

PROC Wait(CARD w,j)
FOR j=0 TO w DO w==+1:w=-1 00 RETURN

; TRIG
MODULE:BYTE ARRAY si(91)

PROC SetTrig(BYTE t INT w)
FOR t=0 TO 90 DO w=(t*7)/45
  y=(w*7)/5:w=100-t-y:w==45:si(t)=w
  00 RETURN

INT FUNC sin(INT t,y):t==MOD 360
IF t<91 THEN y=si(t)
ELSEIF t<181 THEN y=-si(180-t)
ELSEIF t<271 THEN y=-si(t-180)
ELSE y=si(360-t) FI RETURN(y)

INT FUNC cos(INT t,y):t==MOD 360
IF t<91 THEN y=si(90-t)
ELSEIF t<181 THEN y=-si(t-90)

```

```
ELSEIF t<271 THEN y=-54(270-t)
ELSE y=54(t-270) FI RETURN(v)

: VECTOR
INT FUNC ABS(INT x)
IF x<0 THEN x=-x FI RETURN(x)
```

```
INT FUNC SOR(INT x):INT y
IF x=0 THEN RETURN(0) FI:x=ABS(x):y=0
00 y==+1:IF y>+y>x THEN RETURN(y) FI 00
```

```
INT FUNC Vdot(INT ARRAY v,w):INT x
x:=v(0)*w(0):x==+v(1)*w(1)
x==+v(2)*w(2):RETURN(x)
```

```
PROC Vprod(INT ARRAY v,w,u)
u(0)=v(1)*w(2):u(0)=-v(2)*w(1)
u(1)=v(2)*w(0):u(1)=-v(0)*w(2)
u(2)=v(0)*w(1):u(2)=-v(1)*w(0)
RETURN
```

```
PROC Normize(INT ARRAY v):INT i,j,s
i=ABS(v(0))
j=ABS(v(1)):IF i<j THEN i=j FI
j=ABS(v(2)):IF i<j THEN i=j FI
IF i>100 THEN j=i+1/100
FOR i=0 TO 2 00 v(i)=-/j 00
FI
FOR j=0 TO 1 00 s=Vdot(v,v):s=50R(s)
FOR i=0 TO 2 00 v(i)=v(i)/s/120/5 00
00 RETURN
```

LISTING 3

: COLORS (LISTING 3)

```
MODULE:BYTE ARRAY default(5),CP
,C7=(52 24 130 194 0)
,CB=(52 26 0 194 200)
,CM=(52 24 194 130 00)
```

```
PROC INCC():BYTE i
i=cnow:cnow==+1:Position(10,23)
IF i=5 THEN i=4:cnow=0 FI
Kolor(cnow):i=cior(i):Print0(cnow)
Position(10,23):Print0(i RSH 4)
Put(' ')Position(27,23)
Print0(i & 14):Put(' '):RETURN
```

```
PROC IncHue():BYTE i,j
IF cnow=0 THEN i=4 ELSE i=cnow-1 FI
j=cior(i) RSH 4
j==+1:IF j>15 THEN j=0 FI
Position(10,23):Print0(j):Put(' ')
cior(i)=(j LSH 4)+(cior(i) & 14)
C7(i)=cior(i):RETURN
```

```
PROC InclumC():BYTE i,j
IF cnow=0 THEN i=4 ELSE i=cnow-1 FI
j=cior(i) & 14
j==+2:IF j>15 THEN j=0 FI
Position(27,23):Print0(j):Put(' ')
cior(i)=(cior(i) & 248)+j
C7(i)=cior(i):RETURN
```

```
PROC defaultC():BYTE i
FOR i=0 TO 4 00 C7(i)=default(i)
cior(i)=C7(i)
00 RETURN
```

```
PROC set0fault():BYTE i
FOR i=0 TO 4 00 default(i)=C7(i) 00:RETURN
```

```
PROC CPon():BYTE i
FOR i=0 TO 4 00 cior(i)=CP(i) 00:RETURN
```

```
PROC CMon():BYTE i
FOR i=0 TO 4 00 cior(i)=CM(i) 00:RETURN
```

```
PROC fixC01():INCC()
00 WHILE key=255 00 00
IF key=10 THEN key=255:INCC()
ELSEIF key=57 THEN key=255:IncHue()
ELSEIF key=0 THEN key=255:InclumC()
ELSEIF key=50 THEN key=255:0faultC()
ELSE EXIT FI
00 EXIT
```

LISTING 4

: ORAH30 (LISTING 4)

```
MODULE:BYTE vflag=(0),sflag=(7)
INT x,y,s,mas=(3),cx=(00),cy=(90)
,rx=(0),ry=(0),rz=(0),fi=(30)
CARD s=1,d11,d12,lin16,lin17,lin18
,lin19,lin20,lin21,lin22,lin23,lin25
INT ARRAY P(009),eye,foc,R(9),E(9),M(9)
,0=(21:10 5 5:100:0 0 0:0:1
50 0 0:10:0 0 0:2:10 0 0:17:
10 50 0:1:20 50 0:17:20 0 0:1:
30 0 0:17:30 50 0:1:40 50 0:17:
40 0 0:1:0 10 0:19:50 10 0:5:
50 20 0:19:0 20 0:5:0 30 0:19:
50 30 0:5:50 40 0:19:0 40 0:3)
```

```
PROC fixP(INT ARRAY 0):INT i,j
Zero(P,1610):j=4+0(0)+0
FOR i=0 TO j 00 P(i)=0(i) 00
eye=P+2:foc=P+10:RETURN
```

```
PROC Rot(INT ARRAY v):INT x,y,z,s,c
y=v(1)
v(1)=ymcos(rx)/120:v(2)=ym sin(rx)/120
x=v(0):z=v(2):s=sin(rx):c=cos(rx)
v(0)=(xmc-zms)/120:v(2)=(xms+zmc)/120
x=v(0):v(1)=v(1):s=sin(rz):c=cos(rz)
v(0)=xmc-ymc:v(1)=xms+ymc:v(0)=-/120
v(1)=-/120:Normize(v):RETURN
```

```
PROC fixR():INT ARRAY v(3),w(3),u(3)
v(0)=120:v(1)=0:v(2)=0:Rot(v)
w(0)=0:w(1)=120:w(2)=0:Rot(w)
Vprod(v,w,u):Normize(u)
R(0)=v(0):R(1)=v(1):R(2)=v(2)
R(3)=w(0):R(4)=w(1):R(5)=w(2)
R(6)=u(0):R(7)=u(1):R(8)=u(2):RETURN
```

```
PROC fixE():INT s
E(0)=eye(0):E(7)=eye(1):E(8)=eye(2)
Normize(E+12)
IF E(0)=0 THEN E(3)=0:E(4)=0:E(5)=120
ELSEIF E(6)=0 AND E(7)=0 THEN
E(3)=0:E(4)=120:E(5)=0
ELSE E(3)=-E(6):E(4)=-E(7)
E(5)=E(6)*E(6):E(5)=-E(7)*E(7)
E(5)=-/E(0):Normize(E+6)
IF E(0)<0 THEN E(3)=-E(3):E(4)=-E(4)
E(5)=-E(5)
FI
```

```
FI Vprod(E+6,E+12,E):Normize(E):RETURN
```

```
PROC fixMC()
M(0)=Vdot(R,E):M(3)=Vdot(R,E+6)
M(1)=Vdot(R+6,E):M(4)=Vdot(R+6,E+6)
```

continued on next page

```

M(2)=Vdot(R+12,E):M(5)=Vdot(R+12,E+6)
Normalize(M):Normalize(M+6)
UProd(M,M+6,M+12):Normalize(M+12):RETURN

```

```

PRDC Maksxy( INT ARRAY v): BYTE i
INT px,py,pz,t,d: INT ARRAY w(3)
FOR i=0 TO 2 DO w(i)=v(i)-foc(i) DO
IF vflag=1 THEN Px=Vdot(w,M)/128
Py=Vdot(w,M+6)/128
Sx=cx+magwpx/2: Sy=cy+magwpy/2
ELSE d=eye(3): t=magwd/6
Px=Vdot(w,M)/128: Py=Vdot(w,M+6)/128
Pz=Vdot(w,M+12)/128
d==P2: IF d<4 THEN d=4 FI: d==4
Sx=t*px/d: Sy=t*py/d: Sx==cx: Sy=cy-SY
FI RETURN

```

```

PRDC CLR(): Zero(=a1,7680): RETURN

```

```

PRDC Draw( INT ARRAY P): BYTE i
INT ARRAY pt
pt=P+10
FOR i=1 TO P(0) DO pt==+B Maksxy(pt)
Kolor(pt(3): 15)
IF pt(3)<16 THEN LineTo(Sx,Sy)
ELSE Dot(Sx,Sy): xnow=Sx: ynow=Sy FI
DO RETURN

```

LISTING 5

```
: UPDATES (LISTING 5)
```

```

PRDC Uview(): Position(22,15)
vflag==+1: IF vflag>1 THEN vflag=0 FI
IF vflag=0 THEN Print("UPDATE SCREEN")
ELSE Print("UPDATE VIEW") FI: RETURN

```

```

PRDC Ueye(): BYTE i: Position(5,17)
FOR i=0 TO 2 DO
IF eye(i)<-10 THEN eye(i)=-10
ELSEIF eye(i)>10 THEN eye(i)=10 FI
PrintI(eye(i)): Put(' ')
DO Position(24,17)
IF eye(3)>200 THEN eye(3)=200
ELSEIF eye(3)<10 THEN eye(3)=10 FI
PrintI(eye(3)): Put(' '): RETURN

```

```

PRDC Umag(): Position(37,17): mag==+1
IF mag>9 THEN mag=1 FI: PrintI(mag): RETURN

```

```

PRDC Urot(): Position(12,10): PrintI(rx)
Put(' '): PrintI(ry): Put(' ')
PrintI(rz): Ph(2)
FixR(): FixM(): CLR(): Draw(P): RETURN

```

```

PRDC Uri(): Position(35,18)
PrintI(ri): Put(' '): RETURN

```

```

PRDC Ucen( INT x,v): Position(0,19)
PrintI(x): Put(' ')
PrintI(v): Put(' '): RETURN

```

```

PRDC Ufoc( INT ARRAY v): BYTE i
Position(24,19)
FOR i=0 TO 2 DO PrintI(v(i)): Put(' ') DO
RETURN

```

```

PRDC Upt( INT n): Position(5,22): PrintI(n)
Put(' '): IF n<100 THEN Put(' ') FI
Position(36,22): Ph(0): RETURN

```

```

PRDC Uckuz( INT ARRAY pt): BYTE i
Position(15,22): PrintB(pt(3): 3)
IF pt(3)<16 THEN Print(" LineTo ")
ELSE Print(" Plot ") FI

```

```

FOR i=0 TO 2 DO PrintI(pt(i)): Put(' ') DO
RETURN

```

```

PRDC Ugr(): Position(1,15)
IF gflag=7 THEN gflag=0: cx==+00: cy=0
Print("xxx GRAPHICS 0 xxx"): GrP(d11)
ELSE gflag=7: cx==+00: cy=0
Print("xx GRAPHICS 7PLUS x"): GrP(d11)
FI Ucen(cx,cy)
Cpon(3): CLR(): Draw(P): RETURN

```

```

PRDC Ureset(): BYTE i
Position(5,17): Ph(12)
Position(12,10): Ph(12)
Position(0,19): Ph(9)
Position(24,19): Ph(14)
FOR i=1 TO 0 DO P(i)=D(i) DO
mag=S: rx=0: ry=0: rz=0: ri=30: FixR()
Ueye(): Ufoc(foc): Umag(): Urot(): Uri()
cy=90: cx=160: gflag=0: Ugr(): RETURN

```

LISTING 6

```
: STICKSD (LISTING 6)
```

```

PRDC JoyD( INT n): 0=EDIT,1=ADD
BYTE i,k: INT ARRAY pt
IF n=0 THEN f=0 ELSE f=1: n=P(0) FI
n==+1: P=P+10+000: ri=30: FixR()
Kolor(pt(3): 15): Maksxy(pt): Dit(Sx,Sy)
DO IF n>200 THEN EXIT FI
WHILE Strin(0)=0 DO
st=Stick(0): Dit(Sx,Sy)
IF st<15 THEN pt(2)=-Jy(st)
Maksxy(pt): Uckuz(pt)
FI Dit(Sx,Sy)
DO
st=Stick(0): Dit(Sx,Sy)
IF key<255 THEN k=key: key=255
IF k=35 THEN n==+1: Upt(n)
IF pt(3)<16 THEN LineTo(Sx,Sy)
ELSE Dot(Sx,Sy): xnow=Sx: ynow=Sy FI
IF f=1 THEN
FOR i=0 TO 3 DO pt(i+1)=pt(i) DO
FI pt==+B: Kolor(pt(3): 15)
Maksxy(pt): Uckuz(pt)
ELSEIF k=10 THEN IncC()
pt(3)=(pt(3)+16)+cnov: Uckuz(pt)
ELSE key=k: EXIT FI
FI
IF st<15 THEN pt(0)=-Jx(st)
pt(1)=-Jy(st): Maksxy(pt): Uckuz(pt)
FI Dit(Sx,Sy)
DO P(0)=n-1: RETURN

```

```

PRDC JoyF(): BYTE i: INT ARRAY pt(3)
IF cnov=0 THEN Kolor(i) FI
FOR i=0 TO 2 DO pt(i)=foc(i) DO
Maksxy(pt): Dit(Sx,Sy): Ufoc(pt)
DO

```

```

WHILE Strin(0)=0 DO
st=Stick(0): Dit(Sx,Sy)
IF st<15 THEN pt(2)=-Jy(st)
Maksxy(pt): Ufoc(pt)
FI Dit(Sx,Sy)
DO

```

```

st=Stick(0): Dit(Sx,Sy)
IF key<255 THEN k=key: key=255
FOR i=0 TO 2 DO foc(i)=pt(i) DO
CLR(): Draw(P): Maksxy(pt)
ELSEIF key<255 THEN EXIT FI
IF st<15 THEN pt(0)=-Jx(st)
pt(1)=-Jy(st): Maksxy(pt): Ufoc(pt)
FI Dit(Sx,Sy)

```



```

00 Ufoc(foc):RETURN

PROC JOVE(I:INT x,y,z
x:=eye(0):y:=eye(1):z:=eye(2)
00 st:=Stick(0):Ueye(I)
WHILE Strig(0)=0 00 st:=Stick(0)
eye(2)=- Jv(st):eye(3)=-+Jx(st)
Ueye(I)
00
IF key=33 THEN key=255
FIXE(I):FixM(I):CLR(I):Oraw(P)
x:=eye(0):y:=eye(1):z:=eye(2)
ELSEIF key<255 THEN EXIT FI
eye(0)=-+ Jx(st):eye(1)=- Jv(st)
00 eye(0)=x:eye(1)=y:eye(2)=z:Ueye(I)
RETURN

PROC JOVC(I:INT x,y
IF cnow=0 THEN Kolor(I) FI
x:=cx:Y:=cy:bit(x,y)
00 st:=Stick(0):Ucen(x,y):bit(x,y)
IF key=33 THEN key=255
cx:=x:cy:=y:CLR(I):Oraw(P)
ELSEIF key<255 THEN EXIT FI
x=-+ Jx(st):y=-+ Jv(st):bit(x,y)
00 Ucen(x,y):RETURN

```

LISTING 7

```

; DISKIO (LISTING 7)

MODULE:BYTE err
BYTE ARRAY fin(16),abort=" "

PROC MVErr(BYTE e)
Position(1,16):Print("MVErr=");
PrintB(e);err:=1;mes:=1;n21
Position(12,21):PrintB(e)
WHILE key=255 00 00 key=21:RETURN

PROC CIO:=SE456(BYTE a,x)

PROC IO2(BYTE cmd CARD buf,len)
BYTE IOcmd=866 ;7-LOAD 11-SAVE
CARD IObuf=868,IOlen=872
IOcmd:=cmd:IObuf:=buf:IOlen:=len
CIO(0,32):RETURN

PROC Oir(C):BYTE i,j,1ft=02
BYTE ARRAY a(18),f(9)
1ft:=22:Position(22,3)
FOR i=1 TO 11 00 Pb(16):PutE(i) 00
Position(22,3):J=0
Close(2):Open(2,"0:M.V30",6,B)
FOR i=1 TO 22 00 Input5(2,a)
IF a(8)=16 THEN EXIT FI
SCOPY5(f,a,3,18):Print(f)
IF J=8 THEN J:=1:PutE(' ')
ELSE J:=8:PutE(C) FI
00 Position(22,14):Print(a)
Close(2):1ft:=1:RETURN

PROC InP(BYTE ARRAY f):BYTE i
BYTE ARRAY a(18)
SCOPY(f,"0")
Position(23,16):Pb(15)
Position(23,16):Input5(a)
i=a(8)+3:IF i>11 THEN i:=11 FI
SASign(f,a,3,18):SASign(f,".V30",i,14)
Position(23,16):Print(f):RETURN

```

```

WHILE key=255 00 00 k:=key:key=255
IF k<62 THEN Position(1,16):PutE('5')
Print(abort):RETURN
FI t:=Error:Error=MVErr:err=0
n:=0P(0)+10:Close(2):Open(2,fin,0,0)
IF err>0 THEN Close(2):Error=t:RETURN FI
IO2(11,P,n):IO2(11,C,5):Close(2)
Position(1,16):Print("SAVED ")
Error=t:Oir(C) RETURN

PROC LoadP():BYTE k:CARD n,t
Position(1,16):Print("LOAD ")
InP(fin)
Position(1,16):Print("L-LOAD ")
WHILE key=255 00 00 k:=key:key=255
IF k<0 THEN Position(1,16):PutE('L')
Print(abort):RETURN
FI t:=Error:Error=MVErr:err=0
Close(2):Open(2,fin,4,0)
IF err>0 THEN Close(2):Error=t:RETURN FI
IO2(7,P,2):In:=0P(0)+16
IO2(7,P+2,n):IO2(7,C,5):Close(2)
Position(1,16):Print(" ")
Error=t:Sei0fault(C):Open(C)
Position(38,19):Pb(6):RETURN

```

LISTING 8

```

; PRINTIO (LISTING 8)

PROC Ppt(INT ARRAY v)
Print(2,"C"):PrintIO(2,v(0))
Print(2," ") :PrintIO(2,v(1))
Print(2," ") :PrintIO(2,v(2))
Print(2," ") :PrintIO(2,v(3))
Print(2," ") :RETURN

PROC Prnt():BYTE i,j,k:CARD n,t
BYTE ARRAY a(13),st(3 27 51 16)
,Pre=(4 27 75 192 0),s,d(193)
Position(1,16):Print("MPXMODEM ")
WHILE key=255 00 00 k:=key:key=255
IF k<10 AND k<05B THEN Position(1,24)
PutE('P'):Print(abort):RETURN
FI t:=Error:Error=MVErr:err=0
Close(2):Open(2,"P",0,0)
IF err>0 THEN Close(2):Error=t:RETURN FI
B(0)=12:SCOPY(a,b):SCOPY5(a,fin,3,14)
PrintOE(2," ") :PrintOE(2,a)
IF err>0 THEN Close(2):Error=t:RETURN FI
IF k=10 THEN st(3)=16:PrintOE(2,st)
s:=s+1:d(0)=192
FOR i=0 TO 39 00 n:=7640+i
FOR j=1 TO 192 00 d(j)=s(n):n:=n-40 00
PrintO(2,Pre):PrintOE(2,d)
00
ELSE st(3)=20:PrintOE(2,st)
PrintO(2,"eye="):Ppt(eye)
PrintO(2," focus="):Ppt(foc)
PrintOE(2," ") :i=0:j=0:n=p+10
00 i:=+1:IF i>P(0) THEN EXIT FI
J:=+1:n:=+8:Ppt(n)
IF J>2 THEN J:=8:PutOE(2) FI
00 PrintOE(2," ")
FI Position(1,16):Print(" ")
Error=t:Close(2):RETURN

```

LISTING 9

```

; MENUDD (LISTING 9)

PROC MenuD():BYTE i,1ft=02:BYTE ARRAY a1
d1=d12:5:d11st=d1:d12=d11st

```

continued on next page

[illegible]

LISTING 10

```

; VIEW3D (LISTING 18)
; by Paul Chabot
; ANTiC Magazine

```

```
INCLUDE "D:GR78M.ACT"
INCLUDE "D:MISC1.ACT"
INCLUDE "D:COLORS.ACT"
INCLUDE "D:DRAW3D.ACT"
INCLUDE "D:UPDATES.ACT"
INCLUDE "D:STICK3D.ACT"
INCLUDE "D:DISKID.ACT"
INCLUDE "D:PRINTIO.ACT"
INCLUDE "D:MENUS3D.ACT"
```

```
PROC Setup():BYTE i
SetTrig():SetJxJy():SetBfault():FixP(0)
Gr700N():dl1=dlst:sa1=sa:ram=-33
Graphics(0):ram=+33:dl2=dlst:cur=1
```

```
CHON():Menu():Dir():URset():dlist=dll
MesA=lin20
RETURN
```

```

DO WHILE key=255 DO 00 k=key:key=255
dlist=dlist+CPon()
IF k=31 THEN mes=lin22 :1
JOVD()
ELSEIF k=30 THEN mes=lin22 :2
CLR():JOVD()
ELSEIF k=26 THEN mes=lin17 :3
JOVE()
ELSEIF k=24 THEN mes=lin19 :4
JOVF()
ELSEIF k=20 THEN mes=lin19 :5
JOVC()
ELSEIF k=50 THEN mes=lin28 :0
UReset()
ELSEIF k=22 THEN mes=lin10 :X
rx=(rx+ri+560) MOD 560:Urot()
ELSEIF k=45 THEN mes=lin10 :Y
ry=(ry+ri+560) MOD 560:Urot()
ELSEIF k=23 THEN mes=lin10 :Z
rz=(rz+ri+560) MOD 560:Urot()
ELSEIF k=13 THEN mes=lin10 :I
ri=ri+1:IF ri>45 THEN ri=45 FI:Uri()
ELSEIF k=1 THEN mes=lin10 :J
ri=ri-1:IF ri<45 THEN ri=45 FI:Uri()
ELSEIF k=10 THEN mes=lin23 :C
FixC01()
ELSEIF k=16 THEN mes=lin15 :V
Vkey=C():CLR():Draw(P)
ELSEIF k=37 THEN mes=lin17 :M
Uma9()
ELSEIF k=50 THEN dlist=dlist :D
CMon():Dir()
ELSEIF k=0 THEN mes=lin16 :L
LoadP():Ueye():Ftoc(foc):FixE()
FixM():CLR():Draw(P):mes=lin20
ELSEIF k=62 THEN mes=lin16 :5
SaveP():mes=lin20
ELSEIF k=61 THEN mes=lin15 :G
Ugr()
ELSEIF k=10 THEN mes=lin16 :P
Print():mes=lin20
ELSEIF k=33 THEN mes=lin20 :SPACE
CLR():Draw(P)
ELSE dlist=dlist+CMon()
FI

```

enhance your picture details like NASA does!

PIXEL SCANNER

Article on page 14.

LISTING 1

Don't type the
TYPO II Codes!

```

HY 10 REM GTIA PIXEL AVERAGING
GN 20 REM BY LYN BUCKMAN
FU 30 REM (C) 1985, ANTIC PUBLISHING
ML 40 GOTO 300

IK 100 REM PIXEL AVERAGING ROUTINE
NM 110 REM SET AREA TO BE ENHANCED
V5 111 REM Y-COORDINATE RANGE
VP 112 FOR Y=1 TO 80
V6 113 REM X-COORDINATE RANGE
EL 114 FOR X=1 TO 77
F5 115 REM STOP ATTRACT MODE

```

```

JR 116 POKE 77.0
5N 120 REM LOCATE EACH PINEL AND ASSIGN IT
    TS VALUE TO A VARIABLE
ON 121 LOCATE N-1,Y-1,A
KP 122 LOCATE N-1,Y,0
OZ 123 LOCATE N-1,Y+1,C
JF 124 LOCATE N,Y-1,0
NF 125 LOCATE N,Y,C
JR 126 LOCATE N,Y+1,F
NV 127 LOCATE N,Y-1,G
OL 128 LOCATE N,Y-1,H

```

```

IN 129 LOCATE M+1,V+1,I
CG 130 REM AVERAGE ALL PIXEL VALUES
HG 131 K=INT((A+B+C+D+E+F+G+H)/9)
YF 132 REM LIGHTEN THE BACKGROUND
YL 133 IF K=0 THEN K=0
OF 140 REM REPEAT PIXEL IN NEW COLOR
GO 141 COLOR K:PLOT X,Y+95
WA 150 REM RETURN FOR THE NEXT PIXEL
US 151 NEXT M:NEXT Y
OC 160 REM LOCK SCREEN IN GR-9 MODE
GP 161 POKE 77,0: SOUND 8,65,14,14:GOTO 16
1
SF 199 REM
RM 200 REM DRAW STICK FIGURE BIRD
KK 201 GRAPHICS 9:POKE 712,144
EN 210 REM DRAW TAIL
OY 211 FOR M=1 TO 15:COLOR M:PLOT 15+M,75
:ORANTO 5+M/4,71-M/2:NEXT M
IK 220 REM DRAW BODY
SJ 221 FOR M=16 TO 4 STEP -1:COLOR M:PLOT
15+M/8,6.74-M/8:ORANTO 68-M/1,8.74-M
VZ 222 PLOT 15+M/8,6.66-M/8:ORANTO 68-M/1,8
.66-M:NEXT M
BE 230 REM DRAW WINGS
VP 231 FOR M=1 TO 16:COLOR M:PLOT 4.63:OR
ANTO 10+M,10-M/2:ORANTO M+20,66-M/4:
ORANTO M+24,66-M/4
BJ 232 ORANTO 46+M,28-M/2:ORANTO 75,45:NEXT
M
BL 240 REM DRAW HEAD
LM 241 COLOR 11:FOR M=1 TO 22:PLOT 40+M/2

```

```

.68-M/2:ORANTO 68-M/6,68-M/2:NEXT M
RM 250 REM DRAW BEAK
US 251 COLOR 15:FOR M=1 TO 5:PLOT 73,67:O
RANTO 40+M,67-M:NEXT M:FOR M=1 TO 15:P
LOT 49+M/2,67:ORANTO 75,55:NEXT M
KN 260 REM DRAW EYE
RY 261 COLOR 8:FOR Y=54 TO 56:PLOT 60,Y:O
RANTO 62,Y:NEXT Y
LV 270 GOTO 100
SG 299 REM
SR 300 GRAPHICS 8:POKE 710,20:POKE 712,20
:POKE 709,2
OY 381 ? 17 17 , "DRAWING THE STICK FIGURE BIRD":?
" BY LYN SUTHERLAND"?
NR 382 ? "This demo program draws a stick
-figure bird using normal PLOT and ORAN
TO"
ZI 383 ? "Commands: Then the program 'co
mputer enhanced' the image by sampling
the"
YR 384 ? "Color value of each pixel, and"
"surrounding it with the values of th
e surrounding pixels."?
SO 385 ? "The BASIC routine is slow (take
s about 12 minutes), but the results ar
e worth the wait."?
ZK 386 POKE 752,1:POSITION 12,22:"READY
? PRESS ENTER":POKE 53279,8
VN 328 IF PEEK(53279)<26 THEN 328
SO 330 POKE 53279,0:GOTO 200

```

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Antic


```

VT 940 POKE 54200,0:GRAPHICS 0:POKE 07,11
:POKE 623,192:POKE PEEK(560)+256:PEEK(
561)+166,143:NESTORE
WP 950 ADDR5=1536:POKE 54206,64:FOR K=0
TO 10:READ P:POKE ADDR5+K,P:NEXT K:P=
INT(ADDR5/256):POKE 515,P
WX 960 POKE 512,ADDR5-256:P:POKE 54206,1
92:DATA 72,178,151,2,41,63,141,10,212,
141,27,280,169,0,141,26,200,104,64
ZY 970 RETURN
HM 980 REM MENU
KG 990 GRAPHICS 2+16:POSITION 1,5:?"M6:"
:?"M7"
OP 1000 FOR O=1 TO 500:NEXT O
V0 1010 GRAPHICS 0:POKE 752,1:POKE 710,21
0
KZ 1020 POSITION 0,0:?" " MENU
"17
AL 1030 ? " 1 CREATE NEW MEAVING"
AO 1040 ? " 2 SAVE MEAVING"
KZ 1050 ? " 3 LOAD OLD MEAVING"
KF 1060 ? " 4 LEAVE PROGRAM"
KI 1070 ? ? " Selection ?"
II 1080 CLOSE #1:OPEN #1,4,0,"K:"
NO 1090 GET #1,K:IF K<49 OR K>52 THEN 101
0
IN 1100 A=K-40
XJ 1110 ON A GOSUB 00,1100,1200,010
NY 1120 GOTO 1010
ZY 1130 REM SAVE PATTERN
M0 1140 ? ? " Save to: 1..CASSETTE
2..DISKETTE"
P5 1150 GET #1,K:IF K<49 OR K>50 THEN 114
0
Z0 1160 ON K-40 GOTO 1170,1200
IM 1170 ? ? "Place tape in recorder:?" ?
Press RECORD and PLAY:?"Then type M0
RETURN"
NO 1180 GET #1,K
KH 1190 OPEN #2,0,120,"C":GOTO 1210
RR 1200 ? ? "Insert diskette and pres
s M0:?"GET #1,K:OPEN #2,0,0,"O:ME
AVING"
VM 1210 ? ? " ? "
LG 1220 AOHI=INT(AOH/256):AOL0=AOH-AOHI*2
56
EY 1230 MOOE=PEEK(07)
LO 1240 IO=64:POKE IO+2,11:POKE IO+4,AOL
0:POKE IO+5,AOHI
UI 1250 POKE IO+0,4:POKE IO+9,30
MK 1260 JNK=USR(AOR("hhhhLUV")):32:CLOSE
#2
AV 1270 RETURN
RZ 1280 REM LOAD OLD PATTERN
HM 1290 ? ? "Load from: 1..CASSETTE

```

2..DISKETTE"

```

MH 1300 GET #1,K:IF K<49 OR K>50 THEN 130
0
O5 1310 POKE 752,1
FM 1320 ON K-40 GOTO 1330,1370
JH 1330 ? ? "Insert and queue tape"
LC 1340 ? "Press M0, type M0:?"
HJ 1350 GET #1,K
MC 1360 OPEN #2,4,120,"C":GOTO 1420
MH 1370 ? ? "Insert diskette and pres
s M0:?"
GV 1380 POKE 764,255
CK 1390 IF PEEK(764)>12 THEN 1390
FZ 1400 POKE 764,255
CK 1410 OPEN #2,4,0,"O:MEAVING"
OH 1420 ? ? " ? "
AA 1430 GOSUB 950
LO 1440 AOHI=INT(AOH/256):AOL0=AOH-AOHI*2
56
BO 1450 IO=64:POKE IO+2,7:POKE IO+4,AOL0
:POKE IO+5,AOHI
UP 1460 POKE IO+8,4:POKE IO+9,30
MR 1470 JNK=USR(AOR("hhhhLUV")):32:CLOSE
#2
YH 1480 POKE 712,ASC(MEAVING)+601,76011
IE 1490 FOR N=700 TO 710:POKE N,ASC(MEAV
ING)+6974,H+6974:10:PRINT N:POKE 559,0
MT 1500 L00=1:POP :GOTO 90
ET 1510 REM ERASE MEAVING AND RESET
PU 1520 ? " " ERASING OLD PATTERN"
IT 1530 FOR U=1 TO 40:CL0(U)=0:CL1(U)
=0:PRINT U
CR 1540 S05=" "S015" "ICRS=" "
BW 1550 N=1:V=0:ET=4
OM 1560 FOR I=1 TO 15:N=1
LR 1570 FOR I=1 TO H
OB 1580 S05=CL0(I,I)
TW 1590 CL=ASC(5053)-64
KF 1600 FOR K=X TO H+1:5000 0,AND(1)=255
,10,0:COLOR CL:PILOT N,Y:ORAND0 N,ET:IN
XT H
YO 1610 SOUND 0,0,0,0:PRINT I
PH 1620 N=1:V=0:ET=4
LR 1630 FOR I=1 TO H
MC 1640 S05=CL0(I,I)
JF 1650 CL=ASC(5053)-64
FM 1660 FOR K=X TO H+1:5000 1,AND(1)=255
,10,0:COLOR CL:PILOT N,Y:ORAND0 N,ET:IN
EXT H
LR 1670 SOUND 1,0,0,0:PRINT I:V=ET+1:ET=V+
4
JU 1680 NEXT R
OH 1690 RETURN

```

type-in music construction software

THE MUSICIAN

Article on page 37.

LISTING 1

Don't type the
TYPO II Codes

```

OF 10 REM THE MUSICIAN
NO 20 REM BY ARGEO GIAMORA
FM 30 REM (C) 1985, AOTIC PUBLISHING
NR 40 SI=1:POKE 65,0:GOTO 2000
OC 50 IF PEEK(20) THEN 50
CM 60 A=PEEK(764):RETURN
V0 70 FOR I=1 TO 51:PITCH=ASC(50065(I,I)
33)
VC 80 IF PITCH=255 THEN POKE C1,ASC(50065
(I+1,I+1)):POKE C2,ASC(50065(I+2,I+2))
JV 90 IF PITCH=255 THEN POKE C3,ASC(50065
(I+3,I+3)):I=I+3:NEXT I:GOTO 200
LH 100 IF PITCH=254 THEN POKE C1,0:POKE C
2,0:POKE C3,0:NEXT I

```

```

JT 110 IF PITCH=120 THEN SUBS=1:PITCH=PIT
CH=120:IF PITCH=125 THEN PITCH=120
OM 120 POKE C0,PITCH:POKE 20,R:IF PITCH=0
THEN 170
RJ 130 IF H>15 THEN H=16:1:60500 210
NG 140 VP05=ASC(VP05(I,I)):IF VP05>131 AN
0 VP05=147 THEN VP05=VP05-120:P05ITION
X,VP05:?"M6:"M="X+1
OS 150 IF VP05>203 AND VP05<210 THEN VP05
=VP05-200:P05ITION H,VP05:?"M6:"M="X+1
H 160 POSITION H,VP05:?"M6:"M="X+1:P05ITION
H,VP05-1:?"M6:"M="P05ITION H,VP05-2:?"

```

continued on next page

```

M6:1 "I:N=X+2
OG 170 TEMPO=ASC(ITS(1,13)+TEMP:60SUB 50:I
IF SUBST OR PITCH=0 THEN SUBST=0:NEXT I:G
OTO 200
UT 180 IF A<255 THEN POKE 764,255:IF A=2
0 THEN I=51
NM 190 POKE 53760,0:NEXT I
LS 200 G=0:POKE C1,0:POKE C2,0:POKE C3,0:
POKE C4,0:505:GOTO 180:RETURN
GK 210 POKE 53277,0:ITS="M":M=51:SETCOLOR
4,0,0:C=1:SETCOLOR 0,7,4
TB 220 SETCOLOR 1,1,4:SETCOLOR 2,5,4:IGRA
PHIES 17:POKE 559,46:POKE 53277,3
PA 230 POKE 16,132:POKE 53274,112
TR 240 POKE 756,CNR05/256:POSITION 7,0:
? M6:"Play"
SK 250 POKE 53761,170:POKE 53763,160:POKE
53765,160:POKE 53767,160:POKE 53768,0
POKE 53775,51:IF G THEN RETURN
FY 260 POKE 53254,60:POKE 53255,100:POKE
53260,0:POKE 54279,PH05E:FOR L=704 TO
720:POKE L,60:NEXT L
LN 270 FOR L=53256 TO 53259:POKE L,3:NEXT
L:POKE 53240,60:POKE 53249,92:POKE 53
250,124:POKE 53251,156:GOTO 70
JA 280 INPUT M1:TEMP=INPUT M1.51
LV 290 FOR I=1 TO 51:INPUT M1.CN05:SONGS(
1,I)=CN05:NEXT I
OE 300 FOR I=1 TO 51:INPUT M1.CN05:ITS(1,I
)=CN05:NEXT I:FOR I=1 TO 51
OS 310 INPUT M1.CN05:VP05(1,I)=CN05:NEXT
I:51=51+1:POKE 53762,0:POKE 53764,0:PO
KE 53760,0:RETURN
RL 320 POSITION 4,22:IF M6:" " "IOESCS:"
"NTFLAG=0:RETURN
IL 330 IF MOVEFLAG THEN POSITION XPOS+1,Y
POS:GOTO 360
KS 340 IF SUBST THEN POSITION XPOS,YP05+2:
? M6:" "
VO 350 POSITION XPOS,YP05-2:IF M6:" " "POSI
TION XPOS,YP05
UF 360 IF SHARPFLAT=3 THEN ? M6:"/"
FP 370 IF SHARPFLAT=1 THEN ? M6:"^"
AO 380 IF SHARPFLAT=2 THEN ? M6:"b"
DO 390 IF MOVEFLAG THEN RETURN
FS 400 MOVEFLAG=1:XPOS=XPOS+1:RETURN
410 IF SHARPFLAT THEN GOSUB 330
LI 420 POSITION XPOS,YP05+1:IF M6:" " "POSI
TION XPOS,YP05-3
MF 430 ? M6:" " "POSITION XPOS+1,YP05+1:IF
M6:" " "POSITION XPOS+1,YP05-3:IF M6:" "
OO 440 IF SHARPFLAT THEN POSITION XPOS-1,
YP05+1:IF M6:" " "POSITION XPOS-1,YP05-1:
IF M6:" "
ZG 450 IF SUBST THEN POSITION XPOS,YP05+3:
? M6:" "
UF 460 POSITION XPOS,YP05:IF M6:ITS=" "
ZC 470 IF NTTYPE<1 AND RFLAG=0 THEN POSI
TION XPOS,YP05-1:IF M6:STEM20=" " "POSI
TION XPOS,YP05-2:IF M6:STEM20=" "
Y6 480 IF NTTYPE=0 OR NTTYPE=6 OR NTTYPE=
3 THEN POSITION XPOS+1,YP05-2:IF M6:STEM
MFLAGS
FK 490 IF NTTYPE=6 OR NTTYPE=3 THEN POSIT
ION XPOS+1,YP05-1:IF M6:STEMFLAGS
OL 500 IF NTTYPE=2 THEN POSITION XPOS+1,Y
POS:IF M6:STEMFLAGS
MC 510 IF OUT=1 THEN POSITION XPOS+1,YP05
1:IF M6:" "
LN 520 IF SUBST THEN POSITION XPOS,YP05+2:
? M6:" "
FA 530 IF RFLAG OR NTTYPE=1 THEN POSITION
XPOS,YP05-1:IF M6:" " "POSITION XPOS,Y
P05-2:IF M6:" "
NT 540 GOTO 320
OC 550 REM POLL JOYSTICK
GI 560 A=STICK(0):IF A=15 OR RFLAG THEN 5
90
OO 570 IF A=14 THEN IF YP05+4 THEN YP05=Y
P05-1:GOSUB 410:GOTO 550
Y0 580 IF A=13 THEN IF YP05+10 THEN YP05=
YP05+1:GOSUB 410:GOTO 550
XN 590 A=PEEK(764):IF A<255 THEN POKE 76
4,255:GOTO 620
RN 600 IF STICK(0)=0 THEN 1020
PE 610 GOTO 550
OI 620 IF A=42 THEN POSITION 4,22:IF M6:" "
xst y or a="":GOSUB 2490:GOTO 550
EF 630 IF A=46 THEN NTS=CN05(239):NTTYPE=
1:OESCS="whole":RFLAG=0:GOTO 900
WN 640 IF A=8 THEN SONGS(51,51)=CN05(254)
:51=51+1:POSITION 4,22:IF M6:" " "chord off
" "GOTO 550
FI 650 IF A=10 THEN 1700
MO 660 IF A=45 THEN GOSUB 1670:GOTO 550
IV 670 IF A=63 THEN GOSUB 1900:GOTO 1970
JA 680 IF A=0 THEN GOSUB 1900:GOTO 2010
FE 690 IF A=57 THEN NTS=CN05(239):NTTYPE=
2:OESCS="half":RFLAG=0:GOTO 870
NE 700 IF A=40 THEN 940
JN 710 IF A=47 THEN NTS=CN05(140):NTTYPE=
4:OESCS="quarter":RFLAG=0:GOTO 870
BO 720 IF A=53 THEN NTTYPE=0:STEMFLAGS=CN
RS(224):OESCS="eighth":EIGHTFLAG=1:RFL
AG=0:NTS=CN05(140):GOTO 900
EN 730 IF A=27 THEN NTTYPE=5:STEMFLAGS=CN
RS(224):OESCS="sixteenth":RFLAG=0:EIGH
TFLAG=1:NTS=CN05(140):GOTO 900
CO 750 IF A=34 THEN OUT=1:GOTO 900
GK 760 IF A=7 THEN GOSUB 1270:GOTO 550
G6 770 IF A=62 THEN SUBST=1:GOTO 900
JK 780 IF 754 THEN 51=1:FOR I=1 TO 31500
0,0,15,10,10:FOR 0=1 TO 61000 0:5000
0,0,0,0:NEXT I
UF 790 POSITION 4,22:IF M6:" " "Song cleared:"
GOTO 810
PB 800 GOTO 820
KK 810 FOR I=1 TO 300:NEXT I:FIRSTIME=0:
GOTO 2120
MF 820 IF A=21 THEN SHARPFLAT=2:GOTO 900
NM 830 IF A=90 THEN SHARPFLAT=1:GOTO 900
KO 840 IF A=10 THEN GOSUB 210:FIRSTIME=0:
GOTO 2120
MO 850 IF A=7 THEN GOSUB 550:GOTO 900
OR 860 IF A=35 THEN SHARPFLAT=3:GOTO 900
OK 870 IF EIGHTFLAG THEN POSITION XPOS+1,
YP05-2:IF M6:" " "POSITION XPOS+1,YP05-1:
IF M6:" "
CN 880 IF NOT OUT THEN POSITION XPOS+1,Y
POS:IF M6:" "
MO 890 GOSUB 410:GOTO 550
LO 900 IF NTTYPE<1 THEN GOSUB 410:GOTO 5
50
FM 910 POSITION XPOS,YP05-2:IF M6:" " "POSI
TION XPOS,YP05-1:IF M6:" " "IF EIGHTFLAG
THEN POSITION XPOS+1,YP05-2:IF M6:" "
OO 920 IF EIGHTFLAG THEN POSITION XPOS+1,
YP05-1:IF M6:" " "IF NOT OUT THEN POSIT
ION XPOS+1,YP05:IF M6:" "
GT 930 GOSUB 410:GOTO 550
CS 940 IF NTTYPE=4 THEN NTS="b"
FO 950 IF NTTYPE=2 THEN NTS="^" "NTTYPE=9
NO 960 IF NTTYPE=6 THEN NTS="b"
MC 970 RFLAG=1:IF YP05+12 THEN GOSUB 410:
GOTO 550
UI 980 IF YP05+11 THEN 1010
FN 990 IF YP05+11 THEN FOR YP05-YP05 TO 1
1 STEP 1:GOSUB 410:NEXT YP05
OO 1000 GOTO 550
NU 1010 FOR YP05-YP05 TO 13 STEP -1:GOSUB
410:NEXT YP05:GOTO 550
OC 1020 NM=(YP05-4)+4*(YP05-5)+7*(YP05-6)
+13*(YP05-7)+19*(YP05-8)+25*(YP05-9)+32
0*(YP05-10)+34*(YP05-11)+40
LI 1030 NM=NM+(YP05-12)+43*(YP05-13)+49*
(YP05-14)+55*(YP05-15)+61*(YP05-16)+64*
(YP05-17)+70*(YP05-18)+76
SC 1040 IF SHARPFLAT=1 THEN NM=NM-3
OO 1050 IF SHARPFLAT=2 THEN NM=NM+3
TN 1060 IF SHARPFLAT=3 THEN SHARPFLAT=0
OM 1070 IF RFLAG THEN SOUND 0,10,0,10:GOT
O 1090
NM 1080 SOUND 0,VAL(SCALES*(NM,NH+23),10,1
0
MH 1090 FOR I=1 TO 50:NEXT I:SOUND 0,0,0,
0:TEMP0=100:IF OUT THEN TS(51+1,51)=3:
" "
OM 1100 TEMPO=120*(NTTYPE-1)+60*(NTTYPE-2
+50*(NTTYPE-4)+15*(NTTYPE-8)+7*(NTTYPE
E-6)+3*(NTTYPE-3)

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0W 1110 IF DOT THEN TEMPO=TEMPO+1.5
0X 1120 PITCH=VAL(CSCALE*LN,NH+23):IF SUT
T THEN PITCH=PITCH+10:IF PITCH>256 TH
EN PITCH=253
AJ 1130 SONGS(SI)=CHRS(PITCH):TS(SI,SI)=C
HRS(TEMPO)
LV 1140 IF AFLAG THEN SONGS(SI)=CHRS(0):D
OT=1:SU5T=0:05C5="quarter":NTTYPE=4
TC 1150 VP05(SI,SI)=CHRS(VP05):IF SHARPL
NT=1 THEN VP05(SI,SI)=CHRS(CASC VP05(SI
,SI))+120
05 1160 IF SHARPL0T=2 THEN VP05(SI,SI)=C
HRS(CASC VP05(SI,SI))+200
AU 1170 REM MAKE NEW NOTE
JH 1180 SI=SI+1:POSITION 3.0:IF NT=CHRS(C
140) THEN NT="a"
01 1190 IF NT=CHRS(259) THEN NT="o"
ND 1200 STEM=" " :STEM25=" " :STEMFLGS="
" :IF FIRSTIME=0 THEN FIRSTIME=1:GOTO
0 1220
HK 1210 GOSUB 110:TRAP 40000:IF AFLAG THE
N NT="a":RFLAG=0
ED 1220 MOVEFLAG=0:SVENP05=HP05:HP05=HP05
+2:IF HP05>15 THEN SUBFL+1:HP05=SI:GOSU
B 2130
MH 1230 IF SVENP05=1 THEN SVENP05=3
HN 1240 STEM=CHRS(130):STEM25=CHRS(130)
:STEMFLGS=CHRS(224):IF NT="a" THEN N
T=CHRS(140)
BR 1250 IF NT="a" THEN NT=CHRS(259)
PU 1260 DOT=0:SU5T=0:GOSUB 110:GOTO 550
AL 1270 POSITION 2.2217 M61" enter chor
d " :POSITION 2.2317 M61"then press re
turn"
OT 1280 FOR I=1 TO 3:SOND 0.15,10.10:FOR
0=1 TO 6:NENT 0:SOND 0.0,0.0:NENT I
OH 1290 CWS=" " :OPEN M1.4.0,"K1":POKE
702,0:CI=1:HP=HP05-1
ID 1300 A=PEEK(764):IF A=255 THEN 1300
GR 1310 GET M1.A:POKE 764,255:IF A=155 TH
EN 1470
ZM 1320 IF CI=6 THEN 1300
CM 1330 CHS(CI,CI)=CHRS(A)
LD 1340 IF CHS(A)=6" THEN CHS(CI,CI)=M
1:SI=SI+1
PM 1350 IF CHS(A)=7" THEN CHS(CI,CI)=M
1:SEVENTH=1
TC 1360 CHAS=CH(CI,CI)
MU 1370 IF CHAS="a" THEN CHAS=CHRS(19):GO
00CHAR=1
MT 1380 IF CHAS="m" THEN CHNS=CHRS(10):GO
00CHAR=1
EM 1390 IF CHAS="n" THEN CHAS=CHRS(16):GO
00CHAR=1
AM 1400 IF CHAS="p" THEN CLOSE M1:POSITIO
N HP05-1.2017 M61" :SECONDPA55=0:
GOTO 1630
HR 1410 IF CHAS="a" OR CHNS="b" OR CHAS="c
" OR CHNS="d" OR CHAS="e" OR CHNS="f"
OR CHAS="g" THEN 1450
VT 1420 IF (CHAS="m" OR CHAS="j") AND SEC
ONDPA55 THEN 1460
PJ 1430 IF (GOODCHAR OR SI=TH OR SEVENTH)
AND SECONDP55 THEN 1460
OS 1440 GOTO 1300
LP 1450 SECONDP55=1
BR 1460 POSITION HP.20:7 M61CHAS:GOODCHAR
=0:CI=CI+1:HP=HP+1:GOTO 1300
NU 1470 CLOSE M1:POKE 702,64:SECONDP55=0
:CHAS=CHS(CI,CI)
NI 1480 NH=112*(CHAS="c")+106*(CHAS="d")+
100*(CHAS="e")+97*(CHAS="f")+91*(CHNS=
"m")+85*(CHAS="a")+79*(CHAS="b")
LV 1490 IF CI=2 THEN 051=12:052=21:GOTO 1
610
CV 1500 051=12:052=21:CI=2:IF CHS(2.2)=M
" THEN NH=NH-3:CI=3
TK 1510 IF CHS(2.2)="b" THEN NH=NH+3:CI=3

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1. CI+1)= " " THEN 051=9:052=21
PA 1500 IF CHS(CI,CI)="m" THEN IF CHS(CI+
1,CI+2)="a,j" THEN 051=12:052=33
OM 1500 IF CHS(CI,CI)="m" THEN IF CHS(CI+
1,CI+1)="a" THEN 051=9:052=30
OE 1600 IF CHS(CI,CI)="m" THEN IF CHS(CI+
1,CI+3)="y" THEN 051=9:052=27
IO 1610 SONGS(SI,SI)=CHRS(259):SONGS(SI+1
,SI+3)=CHRS(VAL(CSCALE*LN,NH+23))
GT 1620 SONGS(SI+2,SI+2)=CHRS(VAL(CSCALE*
LN=051,NH=051+23)):SONGS(SI+3,SI+3)=CH
RS(VAL(CSCALE*LN=052,NH=052+23))
OR 1630 SI=TH=SEVENTH=0:SI=SI+4:POSITIO
N 2.2217 M61" " :POSITIO
N 2.2317 M61" "
YM 1640 POSITION 7.2217 M61DESC:IF CHNS=
"m" THEN RETURN
LN 1650 SOND 0.05C(SONGS(SI-3,SI-3)),10.
10:SOND 1.A5C(SONGS(SI-2,SI-2)),10.10
:SOND 2.N5C(SONGS(SI-1,SI-1)),10.10
GT 1660 FOR I=1 TO 20:NENT I:SOND 0.0,0.0
:SOND 1.0,0.0:SOND 2.0,0.0:RETURN
VY 1670 FOR I=1 TO 3:SOND 0.15,10.10:FOR
0=1 TO 6:NENT 0:SOND 0.0,0.0:NENT I
CC 1680 POSITION 5.2017 M61"change tempo"
:POSITION 5.2217 M61" "
MH 1690 POSITION 0.2217 M61CHRS(243):CHRS
(253):CHRS(259):CHRS(243):CHRS(229):CN
RS(242):TEMPO=0.25
LU 1700 A=STICK(0)
KV 1710 IF A=14 THEN POSITION 0.2217 M61C
HRS(230):CHRS(225):CHNS(243):CHRS(244)
:CHRS(229):CHRS(242)
KD 1720 TEMPO=0.25:GOTO 1700
HS 1730 IF N=13 THEN 1690
HR 1740 IF STRICK(0)=0 THEN 1760
OH 1750 GOTO 1700
HO 1760 TEMP=TEMP/TEMPO:FOR I=1 TO 3:SOND
0.15,10.10:FOR 0=1 TO 6:NENT 0:SOND
0.0,0.0:NENT I
IJ 1770 POSITION 4.2217 M61" " :DESC:SI"
" :RETURN
OF 1780 SI=SI-1:FOR I=1 TO 3:SOND 0.15,1
0.10:FOR 0=1 TO 6:NENT 0
YO 1790 SOND 0.0,0.0:NENT I:POSITION 7.2
217 M61"change tempo"
RO 1800 POSITION HP05,VP05-2:7 M61" :POSI
TION HP05,VP05-1:7 M61" :POSITION
HP05,VP05-7 M61" "
AM 1810 IF SHARPLAT THEN POSITION HP05-1
,VP05-7 M61" "
ID 1820 IF SU5T THEN POSITION HP05,VP05+2
17 M61" "
OD 1830 HP05=SVENP05:IF SI=1 THEN SI=1
UD 1840 IF SI=4 THEN 550
SG 1850 IF ASC(SONGS(SI-3,SI-3))>255 TH
EN SI=SI-4:POSITION 3.2217 M61"chorf can
called"
FL 1860 FOR I=1 TO 100:NENT I:POSITION 3.
2217 M61" "
SO 1870 GOTO 550
HR 1880 IF TS(SI,SI)="a" OR TS(SI,SI)="b"
OR TS(SI,SI)="c" OR TS(SI,SI)="d" THEN
M STEMFLGS="m"
VG 1890 GOSUB 320
LJ 1900 GRAPHICS 10:POKE 53277,0:POKE 559
,34:7 M61" ENTER SONG NAME"
EF 1910 OPEN M1.4.0,"K1":FILNAMES="0":IX=
3:7 M61? M61? M61" "
OG 1920 POKE 16,112:POKE 53774,112
OE 1930 GET M1.CH:IF CH=155 THEN CLOSE M1
:RETURN
CY 1940 IF CH=126 THEN POSITION (PEEK(05)
-13):(PEEK(04)):7 M61" :POSITION (PEE
K(05)-13):(PEEK(04)):IX=1:GOTO 1950
PM 1950 IF CHS(EN)CH="a" OR CHS(EN)CH="z" T
HEN 1930
MO 1960 FILENAMES(CI)=CHRS(CH):7 M61CHRS(C
H+120):IX=IX+1:GOTO 1930
FM 1970 IF LEN(FILENAMES)=2 THEN OPEN M1.
0.0,"C1":FOR I=1 TO 120:PUT M1.CH:NENT
I:GOTO 1990
GU 1980 OPEN M1.0.0:FILENAMES

```

continued on next page

```

ZP 1990 ? M1:TEMP:=? M1:SI-1:FOR I=1 TO SI
  1:CHAS:=SOMG(I):? M1:CHAS:BEHT I:FOR
  I=1 TO SI-1:CHAS:=TS(I)
IK 2000 ? M1:CHAS:BEHT I:FOR I=1 TO SI-1
  CHAS:=YPO5(I):? M1:CHAS:BEHT I:CLOSE M1
  :FAS:TIME:=0:GOTO 2120
IT 2010 ? M1:TIME:=0:TRAP 2040
OO 2020 IF LEN(FILNAMES)=2 THEN OPEN M1,
  4,0,"C":IFOR I=1 TO 120:GET M1:CHIN:BEHT
  I:GOTO 2050
UT 2030 OPEN M1,4,0,FILNAMES:GOTO 2050
NM 2040 CLOSE M1:GOTO 2120
AY 2050 SI:=NTG:=M1:GOSUB 208:CLOSE M1:G
  0500 210:FAS:TIME:=0:GOTO 2120
LK 2060 REM INITIALIZE SCREEN
  2070 DIM B(1513),STEM5(13),STEM25(13),50
  N65(1000),TS(1000),YPO5(1000),50NAMES(1
  23),FILNAMES(12)
HF 2080 DIM SCALES(1173),STEMFLAGS(13),DESC
  5(153):DESC5="quarter":DIM CH5(53),CHAS(
  13)
PD 2090 SCALES="0200290510330350570400420
  450470500550570600064006072070001005091
  09610210011412112013014415151621715102"
YH 2100 SCREEN(1100)=""195204217250243255"
  60500 2200:TEMP:=1
VV 2110 CO=53760:CI=53762:C2=53764:C3=537
  66
GR 2120 NTG="M1:STEM1=" M1:STEM25=" M1:BEHT
  YPE:=4:DESC5="quarter":YPO5=12:XPO5=1
IP 2130 POKE 53277,0:GRAPHICS 175:SETCOLOR
  0,0,0:POKE 756,INT(CHROASE/256):POSET
  100 5,0:7 M6:"The Musician"
CH 2140 POKE 16,112:POKE 53774,112
NM 2150 POSITION 7,22:7 M6:DESC5:POKE 559
  4,0:POKE 53277,5:POKE 53254,60:POKE 53
  255,100:POKE 53260,0:POKE 623,4
CZ 2160 FOR I=CHROASE TO CHROASE+7:POKE I
  ,0:BEHT I:FOR L=704 TO 707:POKE L,120:
  BEHT L
KY 2170 FOR L=53256 TO 53259:POKE L,5:BEHT
  L:POKE 53240,60:POKE 53249,92:POKE 5
  3250,124:POKE 53251,155
GE 2180 IF SUMFL THEN SUMFL=0:RETURN
SR 2190 GOTO 1190
PR 2200 GRAPHICS 17:P=57856:PMOASE=10T(1
  PEEK(106)-123+2563:10243+1024
  50 2210 CHROASE=10T(1+(PEEK(106)-10)+256)
  /1024-133+1024
CT 2220 POKE 16,112:POKE 53774,112
RD 2230 FOR I=1 TO 15:POSITION 5,I:7 M6:"
  0200 00000000":BEHT I:7 M6:7 M6:7 M6"
  P=0,1,0"
MS 2240 DIM E5(763):FOR I=1 TO 76:READ A:E
  5(I)=CHR$(A):BEHT I
MO 2250 DATA 104,104,133,193,104,133,192,

```

```

104,133,197,104,133
OH 2260 DATA 196,109,226,133,195,109,R,13
  5,194,100,R,102,0,177,194,145
YF 2270 DATA 192,200,192,0,200,247,252,22
  4,5,240,10,250,193,250
OI 2280 DATA 195,100,0,109,0,240,232,162,
  0,100,0,109,0,145,100,200
IC 2290 DATA 192,0,200,249,232,224,5,240,
  0,100,0,250,197,109,0,240,236,96
IE 2300 M=USR$(HORSE),CHROASE,PMOASE:P=5
  7344+176:FOR I=CHROASE+176 TO CHROASE+
  103:POKE I,PEEK(P):P=P+1:BEHT I
VK 2310 P=57344+104:FOR I=CHROASE+104 TO
  CHROASE+191:POKE I,PEEK(P):P=P+1:BEHT
  I
VN 2320 P=57344+24:FOR I=CHROASE+120 TO C
  HROASE+135:POKE I,PEEK(P):P=P+1:BEHT I
  P=57344+112
FI 2330 FOR I=CHROASE+96 TO CHROASE+103:P
  OKE I,PEEK(P):P=P+1:BEHT I:P=57344+100
OF 2340 FOR I=CHROASE+256 TO CHROASE+263:
  POKE I,PEEK(P):P=P+1:BEHT I
CO 2350 FOR I=CHROASE+00 TO CHROASE+07:RE
  AD A:POKE I,A:BEHT I:FOR I=CHROASE+64
  TO CHROASE+71:READ A:POKE I,A:BEHT I
UA 2360 FOR I=CHROASE+40 TO CHROASE+55:RE
  AD A:POKE I,A:BEHT I
MN 2370 START=PMOASE:PMOASE=PMOASE/256
MP 2380 FOR I=START+304+49 TO START+304+0
  1:POKE I,240:BEHT I
CD 2390 FOR I=START+512+49 TO START+640-4
  1 STEP 0:POKE I,255:FOR Z=I+1 TO I+7:P
  OKE Z,0:BEHT Z:BEHT I
NP 2400 FOR I=START+640+49 TO START+760-4
  1 STEP 0:POKE I,255:FOR Z=I+1 TO I+7:P
  OKE Z,0:BEHT Z:BEHT I
CP 2410 FOR I=START+760+49 TO START+890-4
  1 STEP 0:POKE I,255:FOR Z=I+1 TO I+7:P
  OKE Z,0:BEHT Z:BEHT I
OH 2420 FOR I=START+096+49 TO START+1024-
  41 STEP 0:POKE I,255:FOR Z=I+1 TO I+7:
  POKE Z,0:BEHT Z:BEHT I
SH 2430 POKE 15,INT(CHROASE/256):A=CHROAS
  E-(INT(CHROASE/256)+256):POKE 14,A
YD 2440 POKE 54279,PMOASE:POKE 559,46:P
  OKE 53277,3
MT 2450 POKE 53760,0:RETURN
AC 2460 DATA 40,24,20,40,24,20,40,24
  01 2470 DATA 40,62,4,0,0,16,16,32
  SK 2480 DATA 0,36,44,52,36,44,52,4
  HO 2490 A=PEEK(764):IF A=255 THEN 2490
  HE 2500 POKE 764,255:IF A<43 THEN POSITI
  ON 4,22:7 M6:" " :RETURN
UM 2510 FOR I=1 TO 20:BEHT I
YZ 2520 M=USR$(04043)

```

let your joystick select program hues!

COLR PALETTE

Article on page 21.

LISTING 1

Don't type the
TYPE if Codes!

```

ZC 10 REM COLR PALETTE
TP 20 REM BY JOHN M. FELTON
FW 30 REM (C) 1905, ARVIC PUBLISHING
JR 40 REM INITIAL COLORS
HT 50 DATA 40,202,140,70
PC 60 DATA 50,02,252,114,172,244,190,0
HO 70 REM DISPLAY LIST
CV 80 DATA 112,112,64,69,0,0,133,0,130,0,
  5,133,0,130,0,5,133,0,2,0,2,0,6,0,0,2,2
  ,2,2,2,0,0,0,0,5
EK 90 REM DISP. LIST INTERRUPTS
TU 100 DATA 72,173,200,2,69,79,37,70,141,

```

```

18,212,141,24,200,173,7,6,69,79,37,70,
  141,23,200,109,50,141,0,2,169,6,141
GR 110 DATA 1,2,180,64
OH 120 DATA 72,173,0,6,69,79,37,70,141,10
  ,212,141,22,200,173,1,6,69,79,37,70,14
  1,23,200,173,2,6,69,79,37,70,141,24
V5 130 DATA 200,173,3,6,69,79,37,70,141,2
  5,200,169,106,141,0,2,169,6,141,1,2,10
  4,64
AS 140 DATA 72,173,200,2,69,79,37,70,141,
  18,212,141,24,200,173,7,6,69,79,37,70,
  141,23,200,109,142,141,0,2,169,6,141

```



```

01 150 DATA 1.2,184.6,1
02 160 DATA 72,123.4,6.6,69.79,37.78,141.18
03 212.141,22.288,173.5,6.69,79.37,78.14
04 1.23,208,173.6,6.69,79.37,78.14,24
05 170 DATA 208,169,180,141.0,2,169.6,141
06 1.2,184.6,1
07 180 DATA 72,123.208,2.69,79.37,78,141.
08 18,21.24,21,220,169,224,141,9,212,17
09 3,7,6,69,79,37,78,141,23,208,184.6,1
10 190 REM W/B INTERRUPT
11 200 DATA 169,14,141,8,2,169,6,141,1,2,
12 76,95,228
13 210 DATA 184,168,219,162,6,169,6,32,92
14 228,96
15 220 REM SCROLL SUBROUTINE
16 230 DATA 184,184,141,8,8,184,141,8,8,9
17 6
18 240 DATA GCY,CGLD,ORANGE,RED,PINK,VIO
19 LET,PURPLE,BLUE,CYAN,LT BLUE,TURBOISE
20
21 250 DATA BLUE-GRN,GRN,GRN,VLLN-GRN,ORNG-
22 GRN,LT ORANGE
23 260 CH PM5(1824),SC9(708),C(12),CR5(4
24 12),BLANK(18),A5(208),BLK5(18),ROUTINE5
25 (18)
26 270 REM TITLE PAGE
27 280 POKE 186,PEEK(748)
28 290 GRAPHICS 0:SETCOLOR 3,5,6:SETCOLOR
29 8,14,10:POKE 718,0:POKE 752,1
30 300 N=PEEK(568)+PEEK(5613)+256+9:POKE N
31 ,6:POKE N+1,6
32 310 POSITION 4,4:"*****
33 *****"
34 320 POSITION 10,10:"BY"
35 330 POSITION 13,12:"JOHN W. FELTON"
36 340 REM INITIALIZE
37 350 RESTORE 180:FOR N=1550 TO 1778:REA
38 D A:POKE N,A:NEXT N
39 360 POSITION 11,20:"(BACK TO A MOMEN
40 T)"
41 370 RESTORE 58:FOR N=1 TO 12:READ A:C
42 M=A:NEXT N
43 380 RESTORE 68:FOR N=0 TO 7:READ A:POK
44 E 1536+N,A:NEXT N
45 390 SC9(13)="*SC9(708)=SC9:SC9(2)=SC5
46
47 400 PHASE=256+(PEEK(186)-8)
48 410 B5CH=INT(PHASE/256-5):B5CL=8
49 420 FOR N=96 TO 288:POKE PHASE+N,PEEK
50 (52344+N):NEXT N
51 430 REM SET UP DISPLAY LIST
52 440 GRAPHICS 17:POKE 559,0
53 450 DL=PHASE-256+6:SCLOW=DL+22:SCRHI
54 GN=DL+23
55 460 RESTORE 88:FOR N=0 TO 32:READ A:PO
56 KE DL+N,A:NEXT N
57 470 POKE SCLOW,B5CL:POKE SCRHGH,B5CH
58 :POKE DL+53,PEEK(568):POKE DL+34,PEEK
59 5613
60 480 POKE DL+4,PEEK(BB):POKE DL+5,PEEK(
61 893):POKE 568,BL-INT(OL/256):POKE 5
62 61,OL/256
63 490 POKE(BB)+PEEK(893)+256+400,HIGH=I
64 NTH(256):LOW=N-HIGH+256:POKE BL+38,LO
65 W=PEEK(51,HI)+HI
66 500 POKE 512,1:POKE 513,6:POKE 542B,
67 192:POKE 1543,10
68 510 REM INIT SCROLL SUBROUTINE
69 520 RESTORE 238:FOR N=1 TO 18:READ A:R
70 OUTINES(N,N)=CHR$(A):NEXT N
71 530 HIGH=INT(SCRLOW/256):LOW=SCRLOW-HI
72 GH=250-ROUTINES(5,B)-CHR$(LOW):ROUTINE
73 5(9,9)=CHR$(HIGH)
74 540 HIGH=INT(SCRHIGH/256):LOW=SCRHIGH-
75 HIGH+256:ROUTINES(4,4)=CHR$(LOW):ROUTI
76 NES(5,5)=CHR$(HIGH)
77 550 A=USR(1768)
78 560 REM SET UP P/M GRAPHICS
79 570 VWP=PEEK(14)+PEEK(1453)+256
80 580 STARP=PEEK(1418)+PEEK(1413)+256
81 590 OFFSET=PHASE-STARP
82 600 HT=INT(OFFSET/256):LOW=OFFSET-HI*2
83 56
84 610 POKE VWP+2,LOW:POKE VWP+3,HI
85 620 PM5(512)="*PM5(648)=PM5(512):PM5
86 (513)=PM5(512)
87 630 POKE 186,PEEK(748,47):POKE 5856,
88 *****"
89 640 POKE 54279,INT(PHASE/256):POKE 53
90 277,3:POKE 756,INT(PHASE/256)
91 650 PMS(9,33)="*****
92 *****"
93 660 REM DRAW SCREEN
94 670 T5CH=PEEK(189):T5CL=PEEK(BB):POKE B
95 ,85CH:POKE 88,B5CL
96 680 POKE 87,0:POKE 752,1:POSITION 0,0:
97 7 5CS
98 690 RESTORE 248:FOR N=0 TO 15:READ A5:
99 POSITION 1,N1? "M":A5:POSITION 16-(N
100 1),N1? M:POSITION 39,N1? "M":NEXT N
101 700 POKE 88,T5CL:POKE 89,T5CH:POKE 87,
102 0
103 710 FOR N=1 TO 31 STEP 10:COLOR 33+(
104 113+(N-21)=2+(N-31)=138:FOR M=0 TO 6:
105 STEP 3
106 720 FOR I=0 TO 8:FOR J=0 TO 1:PILOT N+I
107 ,M,J-EM=6 AND M=31+3:NEXT J:NEXT I
108 730 NEXT M:NEXT N
109 740 POKE 87,0:POKE 752,1
110 750 FOR C=1 TO 12:GOSUB 1200:NEXT C
111 760 POSITION 1,9:7 46:"*****
112 *****"
113 770 POSITION 1,18:7 46:"*****
114 *****"
115 780 POKE 89,B5CH:POKE 88,B5CL
116 790 CR55="*****
117 *****"
118 800 BLK5="*****"
119 810 POKE 569,46
120 820 LY=520-V-1:N=1:GOTO 928
121 830 REM UPPER WINDOW ROUTINE
122 840 IF STRIG(8)=0 THEN 840
123 850 IF STRIG(8)=0 THEN GOSUB 1350:GOTO
124 980
125 860 FOR DELAY=1 TO 15:NEXT DELAY
126 870 GOSUB 1210
127 880 IF OR(8)=0 AND DY=8 THEN 850
128 890 JOKE 77,0
129 900 N=N+DN:V=V+DV
130 910 N=N-KN-EN=53+4+(KN=8)=4:V=V-EN+43+CV
131 =0)+8
132 920 PMS(LV,LY+9)=BLK5
133 930 LY=V+21+589
134 940 PMS(53248,N)+40+22
135 950 PMS(LV,LY+9)=CR55
136 960 GOTO 840
137 970 REM LOWER WINDOW ROUTINE
138 980 CLOC=1527+H+Y+4:CLOC=CLOC-(V-1)=82
139 4+1F V+5 AND N=4 THEN CLOC=712
140 990 C=N+Y-13+4:COLR=INT(C/163):LUM=
141 ECC(3-COLR)=16
142 1000 B5CLN=B5CL+B5CH+256
143 1010 B5CLC=B5CLN+COLR*2 AND COLR(133)=
144 COLR*2 AND COLR(12)=488
145 1020 GOSUB 1240
146 1030 B5LUM=B5LUM+19+CLUM*9+B5LUM*8/2:BY=C
147 LR:POSITION 88,BY? "X":LBN=B5LBY=BY
148 1040 IF STRIG(8)=0 THEN 980
149 1050 GOSUB 1210
150 1060 IF STRIG(8)=0 THEN POSITION 88,BY
151 :? " *GOSUB 1350:GOTO 840
152 1070 B5H=B5H+8X=2:BN=BN+(BN*27)+BN:BY=BY
153 4+BY
154 1080 IF BN=LBN AND BY=LBY THEN 1050
155 1090 POKE 77,0
156 1100 IF BN*37 OR BN*13 THEN BN=LBN:BN=
157 0
158 1110 IF BY*15 OR BY*8 THEN BY=LBY:BY=0
159
160 1120 POSITION LBN,LBY:? " "
161 1130 IF B5CRN=BY+48+5CLOC THEN 5CLOC=5
162 CLOC+40:GOSUB 1240
163 1140 IF B5CRN=BY+40+5CLOC+200 THEN 5C
164 LOC=5CLOC+40:GOSUB 1240
165 1150 POSITION 88,BY? "H":LBN=BN:LBY=BY
166
167 1160 LUM=LUM+BN*2+CLOC:LUM=16+BY:POKE CL
168 OC,CLOC=CLOC:GOSUB 1280
169 1170 POKE 88,B5CL:POKE 89,B5CH:GOSUB 1
170 300
171 1180 POKE 88,B5CL:POKE 89,B5CH
172 1190 GOTO 1050
173 1200 REM READ JOYSTICK SUB
174
175 *****
176 *****
177 *****
178 *****
179 *****
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TN 1210 S=STICK(0)/OH=(5)*4 AND 5<0)-(5)*8
AND 5<12):OV=(5)*5 OR 5=9 OR 5=13)-(5)*6
OR 5=10 OR 5=14)
ON 1220 POKE 16,112:POKE 53774,112:RETURN

GN 1230 REM SCROLL SUB
OB 1240 A=USR(ADR(ROUTINE),SCLOC):RETURN

PF 1250 REM SET TENT COLOR SUB
GV 1260 A=PEEK(7123)-INT(PEEK(7123)/16)*16:
POKE 1543,16-(R/9)+2:RETURN
ON 1270 REM WRITE HUC/LUM SUB
OR 1280 BV=INT(C(C)/16):LUM=C(C)-BV*16
JN 1290 Y=1+(C/4)+(C/8):H=C-INT(C-1)/4)+
4
HE 1300 POSITION H=10-9-(BV/9),Y=3-1-? "
" :GOTO 1310
IO 1310 POSITION H=10-6,Y=3-1-? LUM:" "
AN 1320 POSITION H=10-3,Y=3-1-? IF C(C)<99
THEN ? " " :IF C(C)<10 THEN ? " "
NN 1330 ? C(C):RETURN
UD 1340 REM BEEP SUB
OF 1350 SOUND 0.5,14.6:FOR N=0 TO 10:HEN
T N:SOUND 0.5,0.0:RETURN

```

LISTING 2

```

10 : COLOR PALETTE INTERRUPTS
20 : JOHN M. FELTON
30 : (C) 1985, ANTIC PUBLISHING
40 :
50 ORKMSK = 54E : ATTRACT MODE RE
OUCE LUMINANCE MASK
60 COLRSH = 54F : ATTRACT MODE CO
LOR SHIFT MASK
70 WSYNC = 5040A : WAIT FOR HORIZO
NTAL SYNCHRONIZATION
REGISTER
80 COLPF0 = 50016 : COLOR REGISTER
FOR PLAYFIELD ZERO
90 COLPF1 = 50017 : COLOR REGISTER
FOR PLAYFIELD ONE
100 COLPF2 = 50018 : COLOR REGISTER
FOR PLAYFIELD TWO
110 COLPF3 = 50019 : COLOR REGISTER
FOR PLAYFIELD THREE
120 COLOR4 = 502C0 : BACKGROUND COLO
R REGISTER SHADOW
130 VDSLST = 50200 : DISPLAY LIST IN
TERRUPT VECTOR
140 SYSV0V = 5E45F : STAGE ONE VERTI
CAL BLANK ENTRY
150 SETV0V = 5E45C : SET VERTICAL BL
ANK VECTOR ROUTINE
160 CHBASE = 50409 : CHARACTER BASE
ADDRESS
170 .ORG 50600 : POSITION ON PAG
E SIX
180 COLR0 .05 1 : DEFINE STORAGE
FOR DISPLAY COLORS
190 COLR1 .05 1
200 COLR2 .05 1
210 COLR3 .05 1
220 COLR4 .05 1
230 COLR5 .05 1
240 COLR6 .05 1
250 COLR7 .05 1
260 .05 4 : EXTRA STORAGE
270 :
280 : INTERRUPT #1
290 :
300 INT1 PHA : PUSH ACCUMULATO
R ON STACK
310 .LOA COLOR4 : LOAD BACKGROUND
COLOR
320 .EOR COLRSH : PERFORM ATTRACT

```

```

MODE OPERATIONS
330 .AND ORKMSK
340 .STA WSYNC : WAIT FOR HORIZO
NTAL BLANK
350 .STA COLPF2 : STORE IN GR.0 B
ACKGROUND COLOR REGISTER
360 .LOA COLR7 : LOAD DISPLAY CO
LOR SEVEN
370 .EOR COLRSH : PERFORM ATTRACT
MODE OPERATIONS
380 .AND ORKMSK
390 .STA COLPF1 : STORE IN GR.0 L
UMINANCE COLOR REGISTER
400 .LOA = <INT2 : LOAD ADDRESS OF
NEXT
410 .STA VDSLST : INTERRUPT INTO
THE
420 .LOA = >INT2 : DISPLAY LIST IN
TERRUPT
430 .STA VDSLST+1 : VECTOR
440 .PLA : POP ACCUMULATOR
OFF OF STACK
450 .RTI : RETURN FROM INT
ERRUPT
460 :
470 : INTERRUPT #2
480 :
490 INT2 PHA : PUSH ACCUMULATO
R ON STACK
500 .LOA COLR0 : LOAD DISPLAY CO
LOR ZERO
510 .EOR COLRSH : PERFORM ATTRACT
MODE OPERATIONS
520 .AND ORKMSK
530 .STA WSYNC : WAIT FOR HORIZO
NTAL BLANK
540 .STA COLPF0 : STORE IN COLOR
REGISTER ZERO
550 .LOA COLR1 : LOAD DISPLAY CO
LOR ONE
560 .EOR COLRSH : PERFORM ATTRACT
OPERATIONS
570 .AND ORKMSK
580 .STA COLPF1 : STORE IN COLOR
REGISTER ONE
590 .LOA COLR2 : LOAD DISPLAY CO
LOR TWO
600 .EOR COLRSH : PERFORM ATTRACT
OPERATIONS
610 .AND ORKMSK
620 .STA COLPF2 : STORE IN COLOR
REGISTER TWO
630 .LOA COLR3 : LOAD DISPLAY CO
LOR 3
640 .EOR COLRSH : PERFORM ATTRACT
MODE OPERATIONS
650 .AND ORKMSK
660 .STA COLPF3 : STORE IN COLOR
REGISTER THREE
670 .LOA = <INT3 : LOAD ADDRESS OF
NEXT
680 .STA VDSLST : INTERRUPT INTO
690 .LOA = >INT3 : DISPLAY LIST IN
TERRUPT
700 .STA VDSLST+1 : VECTOR
710 .PLA : POP ACCUMULATOR
OFF OF STACK
720 .RTI : RETURN FROM INT
ERRUPT
730 :
740 : INTERRUPT #3
750 :
760 INT3 PHA : PUSH ACCUMULATO
R ON STACK

```

```

0770    LDA COLOR4    ; LOAD BACKGROUND
COLOR
0780    EOR COLRSH    ; PERFORM ATTRACT
MODE OPERATIONS
0790    AND DRKMSK
0800    STA WSYNC     ; WAIT FOR HORIZO
NTAL BLANK
0810    STA COLPF2    ; STORE IN GR.0 B
ACKGROUND COLOR REGISTER
0820    LDA COLR7    ; LOAD DISPLAY CO
LOR SEVEN
0830    EOR COLRSH    ; PERFORM ATTRACT
MODE OPERATIONS
0840    AND DRKMSK
0850    STA COLPF1    ; STORE IN GR.0 L
UMINANCE COLOR REGISTER
0860    LDA # <INT4 ; LOAD ADDRESS OF
NEXT
0870    STA VDSLST    ; INTERRUPT INTO
THE
0880    LDA # >INT4 ; DISPLAY LIST IN
TERRUPT
0890    STA VDSLST+1 ; VECTOR
0900    PLA           ; POP ACCUMULATOR
OFF OF STACK
0910    RTI          ; RETURN FROM INT
ERRUPT
0920 ;
0930 ; INTERRUPT #4
0940 ;
0950 INT4 PHA        ; PUSH ACCUMULATO
R ON STACK
0960    LDA COLR4    ; LOAD DISPLAY CO
LOR FOUR
0970    EOR COLRSH    ; PERFORM ATTRACT
MODE OPERATIONS
0980    AND DRKMSK
0990    STA WSYNC     ; WAIT FOR HORIZO
NTAL BLANK
1000    STA COLPF0    ; STORE IN COLOR
REGISTER ZERO
1010    LDA COLR5    ; LOAD DISPLAY CO
LOR FIVE
1020    EOR COLRSH    ; PERFORM ATTRACT
OPERATIONS
1030    AND DRKMSK
1040    STA COLPF1    ; STORE IN COLOR
REGISTER ONE
1050    LDA COLR6    ; LOAD DISPLAY CO
LOR SIX
1060    EOR COLRSH    ; PERFORM ATTRACT
OPERATIONS
1070    AND DRKMSK
1080    STA COLPF2    ; STORE IN COLOR
REGISTER TWO
1090    LDA # <INT5 ; LOAD ADDRESS OF
NEXT
1100    STA VDSLST    ; INTERRUPT INTO
1110    LDA # >INT5 ; DISPLAY LIST IN
TERRUPT
1120    STA VDSLST+1 ; VECTOR
1130    PLA           ; POP ACCUMULATOR
OFF OF STACK
1140    RTI          ; RETURN FROM INT
ERRUPT
1150 ;
1160 ; INTERRUPT #5
1170 ;
1180 INT5 PHA        ; PUSH ACCUMULATO
R ON STACK
1190    LDA COLOR4    ; LOAD BACKGROUND
COLOR
1200    EOR COLRSH    ; PERFORM ATTRACT
MODE OPERATIONS
1210    AND DRKMSK

```

```

1220    STA WSYNC     ; WAIT FOR HORIZO
NTAL BLANK
1230    STA COLPF2    ; STORE IN GR.0 B
ACKGROUND COLOR REGISTER
1240    LDA #SE0      ; LOAD MSB OF ADD
RESS OF CHARACTER SET IN ROM
1250    STA CHBASE    ; STORE IN CHARAC
TER SET BASE POINTER
1260    LDA COLR7    ; LOAD DISPLAY CO
LOR SEVEN
1270    EOR COLRSH    ; PERFORM ATTRACT
MODE OPERATIONS
1280    AND DRKMSK
1290    STA COLPF1    ; STORE IN GR.0 L
UMINANCE COLOR REGISTER
1300    PLA           ; POP ACCUMULATOR
OFF OF STACK
1310    RTI          ; RETURN FROM INT
ERRUPT
1320 ;
1330 ; VERTICAL BLANK INTERRUPT
1340 ;
1350 VBI LDA # <INT1 ; LOAD ADDRESS OF
FIRST
1360    STA VDSLST    ; INTERRUPT INTO
THE
1370    LDA # >INT1 ; DISPLAY LIST IN
TERRUPT
1380    STA VDSLST+1 ; VECTOR
1390    JMP SVSV00V    ; JUMP TO 05 VERT
ICAL BLANK ROUTINE
1400 ;
1410 ; SET VECTOR TO VERTICAL BLANK IN
TERRUPT
1420 ;
1430    PLA           ; DISCARD NUMBER
OF PARAMETERS PASSED IN BASIC CALL

```

continued on next page

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```

1440 LDY # <VBI ; LOAD Y WITH L50
OF INTERRUPT ADDRESS
1450 LDH # >VBI ; LOAD H WITH M50
OF INTERRUPT ADDRESS
1460 LDA #B ; LOAD ACCUMULATO

```

```

R WITH SIX FOR IMMEDIATE VBI
1470 JSR SETUBV ; CALL OS ROUTINE
TO SET VECTOR
1480 RTS ; RETURN FROM SUB
ROUTINE

```

fast graphic power from BASIC

G.U.P. THE GREAT

Article on page 45.

LISTING 1

Don't type the
TYPO Code!

```

K5 10 REM GUP.BAS
M5 20 REM BY BAREK MIHOCKA
F5 30 REM (C) 1985, ANTIC PUBLISHING
M5 40 DIM FMS(20),TEMS(20),ARS(95)
M5 50 ? "Output filename:":INPUT FMS:CLS
500
S5 60 IF FMS(1,1)="" AND (FMS(2,2)="" OR
  FMS(4,3)="" ) THEN DO
M5 70 TEMS(1,2)="" : TEMS(3,3)=FMS:FMS=TE
  M5
M5 80 TRAP 150
F5 90 ? " ? " : ? "Working... Please Stand by"
L5 100 RESTORE : READ LN:LN=LN+1:DIM AS(LN):
  C=1
M5 110 ARS="" : READ ARS
M5 120 FOR K=1 TO LEN(ARS) STEP 3:POKE 75
  2,255
D5 130 LN=LN+1:POSITION 10,10: ? "(Counto
  wa...T""INT(LN/10)"" ) "
D5 140 AS(C,C)=CHR$(VAL(ARS(C*2+3)):C=C+
  1:NEXT M:GOTO 110
K5 150 NUMH=INT(LN/256):NUMLD=LN-NUMH*2
  56
M5 160 OPEN #1:0,0,FMS
M5 170 AD=ADR(AS):AARI=INT(AD/256):ADL0=A
  D-ADH*256
M5 180 IO=0:ADH:POKE IO+2,1:POKE IO+4,AARD
  IOKE IO+5,ADH:POKE IO+6,NUMLD:POKE IO
  +9,NUMH
E5 190 K=USR(ADR("hhhhLVD")):CLS:CLOSE #1
M5 200 GRAPHICS 0 ? "*****"
M5 300 DATA 1909
M5 1010 DATA 2552550000641040710700000710
  550710390651120651400065000067142004059
  0000672069024000042070020071
F5 1020 DATA 04000710960712330722350720000
  00000039050035040004001035051000055052
  041040410520570000000034057
T5 1030 DATA 000003603500037043000450410
  4004705504305300000000155203041007005
  206510165204041003160109104
M5 1040 DATA 0640372071322200732550571420
  6413320516204224192176034165203160002
  2400009074136240005074136240
C5 1050 DATA 0010741601091050711332141090
  4107213321517221403272000505145214096
  00000002552552550500000000
S5 1060 DATA 000000000000000000000000152400
  1524001524001524000520724525003207243
  2512171942232924725125254
L5 1070 DATA 1652211972032400441760001660
  103422113320316522104030065133223155
  2030450300651972232400069197
P5 1080 DATA 2032400231012091332240320730
  64230283165203197221400051972232400046
  1972242002371360000135207032
M5 1090 DATA 0750041652306241012091332030
  7005106523024200002730215165203145214
  165203024105209133203197223
D5 1100 DATA 200235169255332070320730641
  652031972212400052302030763065096000
  104104104141110065104104133
K5 1110 DATA 2041041041332211041041332221

```

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23110065197221144007166221142110065133
221165204197222144006166222
M5 1120 DATA 1342041332221751100651332030
  321940623020416520419722200240173110
  065133203032194064006000000
M5 1130 DATA 0000001041412000652302000652
  30200065173212005072109000072173210065
  0721690000721732000065072104
M5 1140 DATA 074240219201001200003070730
  64141200065206200065104104133203104104
  133204133226076102065173210
J5 1150 DATA 0651332031732120051332041332
  210104141211006104133221141210065104104
  133222141212005032214065206
M5 1160 DATA 2000652002190900000000000000
  000001652219720420000307610064165221
  197203200003076253066176010
K5 1170 DATA 1662031342211332031652041642
  22135222132204132226165221056229203141
  203066072165204133226169000
T5 1180 DATA 14124007014121100651040160061
  41240070070203066230203066165222056229
  204176090072169001141211006
M5 1190 DATA 1040725550241050011412070661
  00000052214000672141207066173205066133
  14120706611412070661
K5 1200 DATA 0000522140651732050661332101
  691201332251692306141050661411000606173
  2400724000502410221942210
P5 1210 DATA 1052191412130662010012000051
  65210141213066173211066240020165210073
  25513321605219073255133219
C5 1220 DATA 16919014131030661411600661732
  130662400213237306402165225101210135
  225165226101219133226165204
M5 1230 DATA 1972262400202302041652041972
  2624001219722224000003073064230204076
  170000032073064165203197221
M5 1240 DATA 2100052302030761490065060000
  0000000000000000000000000000000056
  2320306600000462050660014207
G5 1250 DATA 0660420401440062372030660762
  40006610920306613620081733170004109203066
  0240650000090165208197222
M5 1260 DATA 1440001642221332221322040320
  73064165200419722240011330204032073064
  165204197222062450906104105
E5 1270 DATA 104133230810410413323101041332
  2513322610413322740236141203066169102
  141207066169000032214066072
F5 1280 DATA 16900001412070661732050661332
  19104032214066173205066133210169255133
  2301652250241012103133225165
M5 1290 DATA 2261021913322617000362260401
  012306236165210506222036133204109170009
  14140041090000141207066162
P5 1300 DATA 000070146004144005024101221
  064102070662200624123431332291730624
  06024003716523002401229133
M5 1310 DATA 2211652300622929291332030321
  94064165231024101236133204165230065229
  2291332032194064070000067
M5 1320 DATA 165256200051165231332041652
  300241012229133203032073064165230065229

```



```

IO 143 ? "23Flat"
IM 144 ? "35Sharp"?
IU 145 TRAP 145:INPUT ACC:IF ACC<1 OR ACC
>3 THEN 145
MO 146 TRAP 40000:IF ACC=2 THEN TONIC=TON
IC+7
VI 147 IF ACC=3 THEN TONIC=TONIC+14
VU 150 GOSUB 1500
GM 150 ? "Pick a chord pattern"
EZ 170 ? "13HeJor"? "23Minor"? "327th"?
? "43Min 7th"?
BO 180 TRAP 180:INPUT CHORO
TI 190 IF CHORO<1 OR CHORO>4 THEN 100
FI 195 CHORO=CHORO-1:TRAP 40000
VY 200 RETURN
EK 500 GOSUB 600:LINE=N:N=N+CHORO
GI 505 POKE 752,1:RESTORE N
GU 510 POSITION 4,2:FOR F=1 TO 6:READ A:7
CHRS(A):" " :NEXT F:FRET=4
EJ 515 FOR F=0 TO 5:READ A:PATTERN(F)=A:N
EXT F
TE 520 FOR F=0 TO 5:FRET=FRET+2:RESTORE P
ATTERN(F)
CR 530 POSITION 4,FRET
JN 535 FOR I=1 TO 5:READ A:7 CHRS(A):" " :
NEXT I:READ A:7 CHRS(A)
EZ 540 NEXT F
OR 600 IF TONIC=05 THEN TONIC=72
NM 601 IF TONIC=79 THEN TONIC=73
NA 602 IF TONIC=74 THEN TONIC=66
PH 603 IF TONIC=61 THEN TONIC=75
AS 604 IF TONIC=62 THEN TONIC=76
WL 605 IF TONIC=77 THEN TONIC=69
VI 606 IF TONIC=64 THEN TONIC=70
OY 607 IF TONIC=68 THEN TONIC=67
MO 608 IF TONIC=63 THEN TONIC=70
UI 650 M=(TONIC-65)*100+2:R0000
AV 699 RETURN
OR 700 ? CHRS(K):
NA 701 IF ACC=2 THEN ? "H":
GM 702 IF ACC=3 THEN ? "M":
FK 703 IF CHORO=1 THEN ? "min":
VC 704 IF CHORO=2 THEN ? "2":
PH 705 IF CHORO=3 THEN ? "major":
UI 706 ? " "
ZY 707 RETURN
JO 710 FOR N=2 TO 16 STEP 2:POSITION 20,N
+2:7 CHRS((M/2)+17):NEXT N:TONE=CHORO
HH 715 I=4:FOR N=4 TO 16 STEP 2
LI 720 POSITION 23,M:7 CHRS(TONES(I)+3):
OM 730 ? CHRS(TONES(I)+13):
OP 735 CHORO=TONES(I)+23:GOSUB 703:I=I+7:M
EXT N:CHORO=TONE
NP 799 POSITION 23,M:7 "MODERN":RETURN :R
EM USE INVERSE VIDEO FOR REST
HL 1500 ? "M":? "Y":? "P":POKE 752,0:7 POKE
710,0:RETURN
MH 1555 FOR TIME=1 TO 200:NEXT TIME:RETUR
N
EZ 1560 TONIC=TONIC+1:K
PO 1561 IF CHRS(K)="5" THEN GOSUB 3000
SO 1562 IF K>40 AND K<56 THEN GOSUB 3100
UN 1563 IF K=0 THEN THEN 3200
OB 1565 IF K<27 THEN 1560
OE 1570 RETURN
LT 2000 DATA 1,19,19,19,19,19,4
OR 2001 DATA 1,19,19,19,20,4
AP 2002 DATA 1,19,20,20,20,19,4
TO 2003 DATA 1,19,20,20,20,4
NK 2004 DATA 20,20,20,20,20,20
FK 2005 DATA 1,19,19,19,20,4
OR 2006 DATA 1,20,20,19,19,4
GR 2007 DATA 20,19,19,19,19,20
HB 2008 DATA 1,19,19,19,20,20
IU 2009 DATA 1,20,19,19,19,4
JF 2010 DATA 20,19,19,19,19,4
ZK 2011 DATA 1,19,19,20,19,20
ZB 2012 DATA 1,19,19,19,20,4
GO 2013 DATA 1,19,19,20,19,4
AC 2014 DATA 1,19,20,19,20,4
NJ 2015 DATA 1,19,20,19,19,4
GC 2016 DATA 1,20,19,20,19,4
GI 2017 DATA 1,19,19,20,19,4
ZD 2018 DATA 1,19,19,19,20,20
OD 2099 REM ABOVE 5015 UP ALL NEEDED
SHAPES FOR FINGER OUTS.
ZK 3000 REM SOUND NOTES INDIVIDUALLY
GY 3005 RESTORE LINE+99:FOR N=0 TO 4:READ
A:PATTERN(N)=A:NEXT N
UD 3010 SOUND 0,PATTERN(0),10,0:GOSUB 155
S
MO 3020 IF CHORO=1 OR CHORO=3 THEN SOUND
1,PATTERN(4),10,0:GOSUB 1555:GOTO 3040
MC 3030 SOUND 1,PATTERN(1),10,0:GOSUB 155
S
MH 3040 SOUND 2,PATTERN(2),10,0:GOSUB 155
S
GS 3050 IF CHORO=2 OR CHORO=3 THEN SOUND
3,PATTERN(3),10,0:GOTO 3060
TR 3055 SOUND 3,INT((PATTERN(0)/2)-0.5),1
0,0
SO 3060 GOSUB 1555:GOSUB 1555:FOR N=0 TO
3:5000 M,M,0,0:HEAT N:RETURN
CE 3100 REM PUT CHORDS INTO MEMORY
GS 3110 TONE=EK+493+7:RESTORE LINE+99
CC 3115 READ ONE,THREE,FIVE,SEV,MINTHREE:
TONE$(TONE)=ONE:TONE$(TONE+2)=FIVE
CR 3120 IF CHORO=0 OR CHORO=2 THEN TONE$(
TONE+1)=THREE:GOTO 3130
LF 3125 TONE$(TONE+1)=MINTHREE
IK 3130 IF CHORO=2 OR CHORO=3 THEN TONE$(
TONE+3)=SEV:GOTO 3140
PB 3135 TONE$(TONE+3)=INT((ONE/2)-0.5)
NM 3140 TONE$(TONE+4)=TONE:TONE$(TONE+5)
=32
OA 3145 IF ACC=2 THEN TONE$(TONE+5)=90
BZ 3150 IF ACC=3 THEN TONE$(TONE+5)=35
OF 3155 TONE$(TONE+6)=CHORO
KE 3160 GOSUB 710:RETURN
MO 3200 REM PLAY CHORDS IN MEMORY
MT 3205 GOSUB 1500:GOSUB 710:POKE 752,1:7
"MODERN" TO STOP PLAYING:REM INVERSE
VIDEO FOR ESC
TG 3210 M=PEEK(764):IF M=20 THEN 3230
MS 3211 IF M=31 THEN K=0
IF 3212 IF M=30 THEN K=1
LN 3213 IF M=26 THEN K=2
LO 3214 IF M=24 THEN K=3
OV 3215 IF M=29 THEN K=4
MO 3216 IF M=27 THEN K=5
OI 3217 IF M=51 THEN K=6
OF 3218 IF M=35 THEN K=7
OO 3219 IF K<0 OR K>7 THEN THEN 3210
MJ 3220 TONE=K+7:IF TONE$(TONE)=32 THEN G
OSUB 3250:GOTO 3210
OM 3225 FOR N=0 TO 3:5000 M,M,TONE$(TONE
+M),10,0:NEXT M:GOTO 3210
ON 3230 FOR N=0 TO 3:5000 M,M,0,0:NEXT N
:RETURN
EF 19050 REM EXPLAIN THE FOLLOWING DATA I
FIRST 5HPRINT OUT M AND 05 ON TOP I
4,0,132 IS SPACE,00 IS N,79 IS 0
OM 19055 REM THE NEXT SIX ARE DATA LINES
TO READ SHAPES FOR EACH CHORD PATTERN.
4,0,2000 IS A FRET W/ NO FINGERS
MZ 19060 REM THE LAST LINE OF DATA IN A
SERIES LINES 20099,20199, etc.,3
SC 19065 REM ARE SOUND NUMBERS:TONIC,THIR
D,SEVENTH,MINOR THIRD.
MH 20000 DATA 00,79,32,32,32,79,2000,2003
,2000,2000,2000,2000
HM 20001 DATA 00,79,32,32,32,79,2001,2002
,2000,2000,2000,2000
JI 20002 DATA 00,79,32,79,32,79,2000,2014
,2000,2000,2000,2000
NG 20003 DATA 00,79,32,79,32,79,2001,2015
,2000,2000,2000,2000
MP 20009 REM A IN THIS ORDER:20000=MAJ3
20001=MIN:20002=7th:20003=10th, 413
otherP(L,0th, etc) are in same order.
MO 20099 DATA 144,114,96,01,121
LS 20100 DATA 00,32,32,32,32,32,2000,2004
,2000,2003,2000,2000
SI 20101 DATA 00,32,32,32,32,32,2000,2004
,2005,2002,2000,2000
PT 20102 DATA 00,32,32,32,32,32,2000,2004
,2000,2014,2000,2000
AR 20103 DATA 00,32,32,32,32,32,2000,2004
,2005,2015,2000,2000
SK 20199 REM 0
PE 20200 DATA 120,102,05,72,100
UE 20205 DATA 00,32,32,79,32,79,2001,2015

```

```

,2009,2000,2000,2000
UD 20201 DATA 00,32,32,32,32,32,2000,2000
,2004,2002,2000
ID 20202 DATA 00,32,32,32,32,79,2001,2015
,2016,2000,2000,2000
OY 20203 DATA 00,32,32,32,32,32,2000,2000
,2004,2005,2015,2000
5V 20290 REM C
B5 20299 DATA 121,96,01,60,102
MU 20300 DATA 00,00,79,32,32,32,2000,2011
,2012,2000,2000,2000
TH 20301 DATA 00,00,79,32,32,32,2000,2017
,2005,2000,2000,2000
MD 20302 DATA 00,00,79,32,32,32,2012,2011
,2000,2000,2000,2000
TR 20303 DATA 00,00,79,32,32,32,2000,2017
,2005,2000,2000,2000
TM 20390 REM D
RY 20399 DATA 100,05,72,61,91
P5 20400 DATA 79,32,32,32,79,79,2017,2006
,2000,2000,2000,2000
OY 20401 DATA 79,32,32,79,79,79,2000,2006
,2000,2000,2000,2000
CJ 20402 DATA 79,32,79,32,79,79,2017,2009
,2000,2000,2000,2000
SP 20403 DATA 79,32,79,79,79,79,2000,2009
,2000,2000,2000,2000
UA 20490 REM E
YI 20499 DATA 96,76,64,55,01
OH 20500 DATA 00,00,32,32,32,32,2010,2017
,2015,2000,2000,2000
KR 20501 DATA 32,32,32,32,32,32,2004,2000
,2006,2000,2000,2000
NJ 20502 DATA 00,00,32,32,32,32,2004,2017
,2009,2000,2000,2000
DA 20503 DATA 32,32,32,32,32,32,2004,2000
,2009,2000,2000,2000
UD 20590 REM F
RM 20599 DATA 91,72,60,50,76
VU 20600 DATA 32,32,79,79,79,32,2000,2009
,2007,2000,2000,2000
OD 20601 DATA 32,32,32,32,32,32,2000,2000
,2004,2000,2000,2000
MJ 20602 DATA 32,32,79,79,79,32,2000,2009
,2010,2000,2000,2000
UD 20603 DATA 32,32,32,32,32,32,2000,2000
,2004,2000,2000,2000
VC 20690 REM G
UD 20699 DATA 162,120,100,91,136
GT 20700 DATA 32,32,32,32,32,32,2000,2000
,2000,2004,2017,2000
OR 20701 DATA 32,32,32,32,32,32,2000,2000
,2000,2004,2000,2000
HM 20702 DATA 00,00,32,32,32,32,2003,2000
,2000,2000,2000,2000
HT 20703 DATA 32,32,32,32,32,32,2000,2000

```

```

,2000,2004,2000,2000
LH 20790 REM A0
GM 20799 DATA 153,121,102,05,120
LE 20800 DATA 00,32,32,32,32,32,2004,2000
,2005,2000,2000,2000
RA 20801 DATA 00,32,32,32,32,32,2004,2005
,2002,2000,2000,2000
OY 20802 DATA 00,32,32,32,32,32,2004,2000
,2014,2000,2000,2000
HZ 20803 DATA 00,32,32,32,32,32,2004,2005
,2015,2000,2000,2000
ML 20890 REM B0
OV 20899 DATA 136,100,91,76,114
EU 20900 REM C FLAT IS REFERRED TO 0
NATURAL
FM 20999 REM C FLAT NOTES ARE 0
OJ 21000 DATA 00,32,32,32,32,32,2000,2000
,2000,2004,2000,2005
MN 21001 DATA 00,32,32,32,32,32,2000,2000
,2000,2004,2005,2002
TE 21002 DATA 00,32,32,32,32,32,2000,2000
,2000,2004,2000,2014
FU 21003 DATA 00,32,32,32,32,32,2000,2000
,2000,2004,2005,2015
ML 21090 REM D0
YI 21099 DATA 114,91,76,64,96
MT 21100 DATA 00,32,32,32,32,32,2000,2000
,2004,2005,2015,2009
PG 21101 DATA 00,00,32,32,32,32,2000,2000
,2017,2014,2000,2000
HA 21102 DATA 00,00,32,32,32,32,2004,2005
,2011,2000,2000,2000
PL 21103 DATA 00,00,32,32,32,32,2015,2016
,2017,2000,2000,2000
MZ 21190 REM E0
UN 21199 DATA 102,05,60,57,91
P5 21200 REM F FLAT IS REFERRED TO E
JM 21299 REM F FLAT NOTES ARE E
ZL 21300 DATA 32,32,32,32,32,32,2000,2004
,2017,2000,2000,2000
ML 21301 DATA 32,32,32,32,32,32,2000,2004
,2000,2006,2000,2000
FJ 21302 DATA 32,32,32,32,32,32,2000,2004
,2017,2000,2000,2000
SJ 21303 DATA 32,32,32,32,32,32,2000,2004
,2000,2009,2000,2000
OR 21390 REM F0
UD 21399 DATA 173,136,114,96,144
KO 21400 REM A SHARP TS 0 FLAT
FF 21400 REM A SHARP TS C
MV 21400 REM C SHARP TS 0 FLAT
OF 21400 REM C SHARP TS E FLAT
JZ 21400 REM E SHARP TS F
DJ 21400 REM F SHARP TS G FLAT
LJ 22000 REM G SHARP TS A FLAT

```

game of the month

HELICOPTER ROUNDUP

Article on page 48.

LISTING 1

Don't type the
TYPE II code

```

IU 10 REM HELICOPTER ROUNDUP
ID 20 REM BY WALTER OBLANA
FM 30 REM (C) 1985, ANTIC PUBLISHING
UI 40 GDSUB 1550:REM GAME INITIALIZATION
NJ 50 GDSUB 1160:REM LEVEL INITIALIZATION

OV 60 5=STICK(0)
IT 70 POKE PHRASE+061:FUEL,F=126:FUEL=FUE
L-B:04:FUELCUSED=FUELCUSED-1
J5 80 POKE 16,112:POKE 53724,112:IF FUEL<
0 THEN 340
G5 90 SOUND 0,15,0,10

```

```

EC 100 HDIF=HIS-41:YDIF=V(5-4)
CF 110 HPD5=HPD5+4*HDIF:YDIF=HPD5+4*YDIF
LF 120 IF HPD5<40 THEN HPD5=40
TJ 130 IF HPD5>200 THEN HPD5=200
PL 140 IF YDIF<0 THEN YDIF=0
YV 150 IF YDIF>112 THEN YDIF=112
FD 160 SOUND 0,0,0,0:SPD=3,0,0,0
DZ 170 IF HDIF=-1 THEN PMD=PMH
EO 180 IF HDIF=-1 THEN PMD=PMH

```

continued on next page

```

YH 190 A=USR(MOVE,0,PHASE,PMO+IC,XPOS,YPOS,YP
05,5-IC)
SF 200 A=USR(MOVE,3,PHASE,PMK,XPOS,YPOS,5)
PA 210 IC-IC+1
00 220 IF IC=2 THEN IC=0:POKE 232,BCOM5:P
0KE 238,XPOS:POKE 231,YPOS:A=USR(1538,
0A(CPOS53))
MD 230 IF PEEK(2003)=BCOM5 THEN IF 00T 00
=55 THEN 405UD 470ID00E=1
EM 240 F=0
MD 250 IF 00T (XPOS=176) THEN 60
0L 260 IF 00T (YPOS=180) THEN 60
JI 270 IF 000C THEN 520
YU 280 SOUND 3,50,14,0
ZU 290 IF STRIG=0 THEN 60
UR 300 POKE PHASE+061-(FUEL+0.04),126
00 310 FUEL=FUEL+0.5:IF FUEL>51 THEN FUEL
=51
00 320 F=1:POKE 77,0:GOTO 60
LS 330 REM END OF MAIN LOOP
0E 340 REM CRASH
EM 350 CRASH=1
CS 360 SOUND 0,100,4,14:SOUND 3,0,0,0
ZS 370 A=USR(MOVE,0,PHASE,PMC,XPOS,YPOS,
0)
AK 380 FOR I=20 TO 200 STEP 4
AM 390 IF I=180 THEN POKE 53256,3
KZ 400 SETCOLOR 4,0
0U 410 FOR 0=1 TO 10:GENT 0
FY 420 GENT I
CE 430 SETCOLOR 4,0,0:SOUND 0,0,0,0
00 440 FOR I=1 TO 400:GENT I
SV 450 POKE 53256,1
00 460 GOTO 530
0U 470 REM CLOSE CORRAL GATE
FA 480 COLOR 131:POKE 6,11:ORAMTO 6,13
K0 490 SOUND 3,40,0,15:FOR I=1 TO 40:GENT
I
00 500 FOR I=150 TO 60 STEP -10:FOR 0=1 T
0 I=50 STEP -5:SOUND 3,0,14,12:GENT 0:
GENT I:SOUND 3,0,0,0
C0 510 POSITION 2,21:Y 0:RETURN TO PAD:
RETURN
KT 520 SOUND 0,0,0,0:FOR I=1 TO 500:GENT
I
0I 530 SCORE=(00T CRASH)*(BCOMS=1000-FUE
LUSE):IF SCORE<0 THEN SCORE=0
AT 540 IF SCORE>HISCORE THEN HISCORE=SCORE
J6 550 POKE 53240,0:POKE 53249,0:POKE 532
58,0:POKE 53251,0
LJ 560 GRAPHICS 1+16:POKE 756,CORASE/256
0P 570 COLOR 131:PLAT 0,0:ORAMTO 10,0:ORA
MTO 19,23:ORAMTO 0,23:ORAMTO 0,0
H5 580 POSITION 2,5:Y 0:HIGH SCORE: "H
ISCORE
Y6 590 POSITION 2,0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
WJ 600 POSITION 3,13:Y 0:Y 0:Y 0:Y 0:Y 0:Y
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
UCLUSE0
0L 610 IF NOT CRASH THEN POSITION 2,14:Y
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
V0 620 IF CRASH THEN POSITION 2,16:Y 0:Y 0:Y
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
CM 630 POSITION 1,20:Y 0:Y 0:Y 0:Y 0:Y 0:Y
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
ZT 640 POKE 53279,0
YT 650 RESTORE 690
00 660 READ I:IF I=1 THEN FOR J=1 TO 200
:GENT J:GOTO 650
0T 670 IF (PEEK(53279))<5 THEN SOUND 3,0,
0,0:BCOMS=BCOMS+1:GOTO 50
0V 680 SOUND 3,1,10,0:FOR J=1 TO 12:GENT
J:GOTO 660
I0 690 DATA 60,60,60,60,60,47,47,47,0,47,4
7,0,47,47,47,0,0,60,60,60,60,45,45
,45,0,45,45,0
HU 700 DATA 45,0,53,53,0,60,60,60,0
710 DATA 60,60,47,47,47,47,47,47,47,4
7,47,53,60,60,0,45,45,47,0,45,45,0,
60,60,60,0,0,0,-1
AJ 720 REM ORAM PLAYFIELD
00 730 GRAPHICS 1+16:POKE 559,0:POKE 756,
CORASE/256
LD 740 SETCOLOR 0,1,4:SETCOLOR 3,2,0
HY 750 COLOR 131:FOR I=0 TO 17:PLAT 6,I:0

```

```

GANTO 13,I:GENT I
JE 760 PLAT 0,0:ORAMTO 10,0:ORAMTO 10,23:
0ORAMTO 0,23:ORAMTO 0,0
HL 770 POSITION 19,20:Y 0:Y 0:Y 0:Y 0:Y 0:Y
0,21:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
POSITION 19,20:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
780 POSITION 15,20:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
15,21:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
"000"
TY 790 REM PLAT T0E5
V0 800 RESTORE 020
MP 810 FOR I=1 TO 5:READ C:READ 0:POSITIO
0 C,0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
:GENT I
JA 820 DATA 0,0,5,5,17,14,4,4,4,10
0 830 REM PLACE COMS
OF 840 COLOR 0
VH 850 F00 I=1 TO 0COM5
MH 860 COL=I0T(17*000(03)+1:ROW-I0T(17*00
0(03)+1)
0P 070 LOCATE COL,00N,HVAL:IF HVAL<32 YH
E0 GOTO 050
00 080 POKE A00(CPOS53)+(I-1)*2,COL:POKE A
00(CPOS53)+(I-1)*2+1,00N:PLAT COL,ROW
60 890 GENT I
6C 900 REM PLACE HELICOPTER
00 910 XPOS=176:YPOS=180:PMO=PHL
M0 920 A=USR(MOVE,0,PHASE,PMO,XPOS,YPOS,
53)
6H 930 POKE 53249,200:POKE 53258,200
RH 940 REM CLEAR CENTER OF CORRAL
KH 950 COLOR 32:F00 I=9 TO 16:PLAT 7,I:0
RAMTO 12,I:GENT I
0Z 960 PLAT 6,11:ORAMTO 6,13
ZT 970 GENT0
AK 980 REM TITLE PAGE DISPLAY
ZT 990 POKE 106,PEEK(740):POKE 53279,0
Z0 1000 POKE 53240,0:POKE 53249,0:POKE 53
258,0:POKE 53251,0
EV 1010 GRAPHICS 2+16:SETCOLOR 1,1,4
TO 1020 POSITION 5,3:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
5:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
HM 1030 COLOR 3:PLAT 0,0:ORAMTO 19,0:ORAM
TO 19,11:ORAMTO 0,11:ORAMTO 0,0
K0 1040 POSITION 4,9:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
JH 1050 RESTORE 690
CV 1060 READ I:IF I=1 THEN FOR J=1 TO 20
0:GENT J:GOTO 1050
GK 1070 IF PEEK(53279)=6 THEN SOUND 3,0,0
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
CE 1080 SOUND 3,I,10,0:F00 J=1 TO 12:GENT
J:GOTO 1060
TH 1090 REM PLEASE WAIT DISPLAY
T0 1100 GRAPHICS 2+16
VT 1110 POSITION 7,4:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
ZY 1120 POSITION 0,7:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
ZA 1130 POSITION 5,10:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
H1 1140 FOR I=1 TO 300:GENT I
00 1150 GENT0
00 1160 REM LEVEL INITIALIZATION
AL 1170 POKE 53240,0:POKE 53249,0:POKE 53
258,0:POKE 53251,0
F5 1180 GRAPHICS 2+16:SETCOLOR 1,1,4
VH 1190 IC=0:FUEL=51
NR 1200 COLOR 3:PLAT 0,0:ORAMTO 19,0:ORAM
TO 19,11:ORAMTO 0,11:ORAMTO 0,0
OR 1210 POSITION 5,2:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
5:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
VU 1220 POSITION 2,7:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
OF 1230 POSITION 2,0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
ZE 1240 POSITION 4,10:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
UE 1250 FOR I=PHASE+010 TO PHASE+061:P0
KE I,126:GENT I
J0 1260 POKE 53279,0
0K 1270 IF PEEK(53279)=5 THEN 0COM5=0COM5
+1:IF 0COM5>30 THEN 0COM5=1
0F 1280 POSITION 16,0:Y 0:Y 0:Y 0:Y 0:Y 0:Y 0:Y
UH 1290 F00 I=1 TO 10:GENT I
UM 1300 IF PEEK(53279)<6 THEN 1260
NK 1310 5000E=0
0J 1320 G0500 720:POKE 623,1:POKE 559,40:
FUELUSE0=0:CRASH=0:000E=0
C0 1330 POKE 53256,1:POKE 53259,1
AR 1340 GENT0
V0 1350 REM INITIALIZATION

```



```

OZ 1500 GOSUB 900:GOSUB 1090
MC 1570 HISCORE=0:MCMS=1
NO 1580 DIM PMMOVES(100):PRS(53):PLS(53):PC
  8(8):CPD55(60):CHNEMS(8)
SW 1590 DIM PH5(53)
YO 1400 DIM H(11):V(11)
YM 1450 MOVEFOR(PMMOVES):PMR=ADR(PRS):PM
  L=ADR(PLS):PMC=ADR(PC53)
DA 1420 PMR=ADR(PC53)
EE 1450 RESTORE 1440:FOR I=5 TO 15:READ #
  :H(I)=H:NI=READ:NI=V(I)=0:NI=H(I)
OO 1440 DATA 1,1,1,-1,1,0,0,0,-1,1,-1,-1,
  -1,0,0,0,1,0,-1,0,0
HY 1450 GRAPHICS 1=16:POKE 559,0
ZE 1460 PMBASE=INT((PEEK(160)-6)/4)+4
JL 1470 CHBASE=INT(PMASE-2)+256
SK 1480 PMBASE=PMASE+256
OM 1490 PRS(1)=CHRS(35):PRS(2)=CHRS(132):
  PRS(3)=CHRS(206):PRS(4)=CHRS(127):PRS(5)
  =CHRS(114)
IM 1500 PLS(1)=CHRS(240):PLS(2)=CHRS(33):
  PLS(3)=CHRS(115):PLS(4)=CHRS(254):PLS(5)
  =CHRS(112)
SO 1510 PC5(1)=CHRS(90):PC5(2)=CHRS(82):P
  C5(3)=CHRS(34):PC5(4)=CHRS(116):PC5(5)
  =CHRS(92):PC5(6)=CHRS(94)
YA 1520 PC5(7)=CHRS(162):PC5(8)=CHRS(163)
KE 1530 PH5(1)=CHRS(8):PH5(2)=CHRS(8):PH5
  (3)=CHRS(129):PH5(4)=CHRS(16):PH5(5)=CH
  RS(8)
OT 1540 REM ERASE P/M AND CHR MEMORY
VF 1550 RM=PEEK(89):RL=PEEK(88)
OA 1560 I=PEEK(186):POKE 186,I-6:POKE 89,
  PEEK(186)-8:POKE 88,0:?" "":POKE 89,8H
  :POKE 88,RL:POKE 186,I
RD 1570 POKE 559,8
NA 1580 REM P/M MOVE ROUTINE
MV 1590 RESTORE 1600:FOR I=1 TO 100:READ
  W:PMMOVES(I)=CHRS(W):NEXT I
HG 1600 DATA 216,184,104,104,133,213,104,
  24,185,2,155,200,104,133,205,104,133,2
  04,184,133,285,104,184,133,280
OB 1610 DATA 104,184,133,289,104,184,24,1
  81,289,133,287,166,213,240,16,165,205,
  24,185,120,133,205,165,206,105
TO 1620 DATA 0,133,200,202,200,240,160,0,
  162,0,196,209,144,19,195,207,176,15,13
  2,212,150,160,177,203,164
UL 1630 DATA 212,145,205,232,169,0,240,4,
  169,0,145,205,200,192,120,200,224,166,
  213,165,280,157,0,200,95
LG 1640 REM CHAR MOVE ROUTINE
OV 1650 RESTORE 1660:I=0
AO 1660 READ W:IF W=-1 THEN 1680
YU 1670 POKE 1536+I,W:I=I+6010:1660
HV 1680 CHNEMS="KVDMMHYZ"
NV 1690 FOR I=0 TO 511:POKE CHBASE+I,PEEK
  (5734+I):NEXT I
NT 1700 RESTORE 1740:Z
AR 1710 FOR I=1 TO 8
NV 1720 CHADD=CHBASE+CASC(CHNEMS(I)):I3=32
  :J=0
OD 1730 FOR J=0 TO 7:READ #:POKE CHADD+J,
  NI:NI=J:J=1
MG 1740 REM TREE TRUNK -K
FA 1750 DATA 24,24,24,24,24,24,24,24
KM 1760 REM TREE LEAVES-V
IC 1770 DATA 64,40,87,25,84,58,120,20
KD 1780 REM LANDING PAD-D
OR 1790 DATA 256,255,255,255,255,255,255,
  255
RJ 1800 REM REFUEL ZONE-M
MS 1810 DATA 251,251,251,0,0,251,251,251
NM 1820 REM FENCE -M
GC 1830 DATA 255,60,60,60,255,60,60,60
WM 1840 REM LEFT COM -H
AA 1850 DATA 64,192,255,63,63,17,17
OP 1860 REM CENTER COM -V
NK 1870 DATA 56,24,24,60,60,60,36,36
IN 1880 REM RIGHT COM -Z
OB 1890 DATA 2,5,255,252,252,136,136,136
WZ 1900 POKE 54279,INT(PMASE/256):POKE 5
  3277,3
YP 1910 POKE 704,0:POKE 705,14:POKE 706,1
  86:POKE 707,252
RR 1920 FOR I=PMASE+640 TO PMASE+895:PO
  KE I,0:NEXT I

```

```

AP 1930 FOR I=PMASE+602 TO PMASE+733:PO
  KE I,129:NEXT I:POKE PMASE+734,255:PO
  KE PMASE+681,255
OO 1940 RETURN
AO 1950 REM COM MOVE ROUTINE
ER 1960 DATA 104,104,133,204,104,133,203,
  169
KU 1970 DATA 0,133,200,165,232,200,1,95
UG 1980 DATA 190,252,165,232,16,166,177,2
  03
VF 1990 DATA 133,219,200,177,203,133,220,
  32
VA 2000 DATA 145,6,165,230,133,207,165,21
  9
SO 2010 DATA 10,10,10,24,105,40,133,200
OV 2020 DATA 52,195,6,130,133,233,24,101
OL 2030 DATA 219,133,221,52,145,6,165,231
VC 2040 DATA 133,207,165,220,10,10,24,105
IC 2050 DATA 165,133,200,32,193,6,130,24
IA 2060 DATA 101,220,133,222,170,32,165,6
TK 2070 DATA 164,221,177,205,201,0,240,10
OK 2080 DATA 165,220,166,219,32,230,6,76
CS 2090 DATA 11,6,169,57,24,101,233,145
VI 2100 DATA 205,166,220,32,165,0,164,219
TO 2110 DATA 169,0,145,205,165,232,10,160
AU 2120 DATA 165,221,145,203,165,222,200,
  145
VF 2130 DATA 203,166,221,32,230,6,76,11
WU 2140 DATA 0,173,10,210,201,235,176,5
HC 2150 DATA 162,0,95,201,245,176,5,162
CY 2160 DATA 1,96,162,255,90,165,80,133
NU 2170 DATA 205,165,89,133,206,130,200,1
IO 2180 DATA 96,165,205,216,24,105,20,133
AO 2190 DATA 205,144,2,230,200,202,200,24
  1
NM 2200 DATA 96,173,10,210,41,31,133,205
OV 2210 DATA 165,207,24,197,206,176,13,16
  5
HO 2220 DATA 206,56,229,207,24,197,205,17
  6
CK 2230 DATA 2,162,1,96,229,206,24,197
ZM 2240 DATA 205,176,2,162,255,96,24,201
JR 2250 DATA 6,176,1,96,207,17,144,1
KL 2260 DATA 96,150,24,201,7,176,1,96
LU 2270 DATA 201,15,144,1,96,230,200,96
FN 2280 DATA -1

```

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TURTLE PIANO

Article on page 10.

LISTING 1

```

TO SIGN :LEN
TELL 10 1) PU
TELL 0 0K 6 TELL 1 FD 14
TELL 10 1) LT 90 FD :LEN / 2 - 10
END

TO STAFF :LEN :HIT
CS PU LT 90 FD :LEN / 2 RT 90 FD :HIT
  * 5 / 2 PD
REPEAT 4 [SETH 90 FD :LEN 0K :LEN RT
90 FD :HIT]
RT 180
REPEAT 2 [FD :HIT * 4 RT 90 FD :LEN R
T 90]
SIGN :LEN
END

TO MEASURE
CS
TELL 2 STAFF 250 10
END

TO DIRECTIONS
CT
PR [IF YOU WANT THE COMPUTER TO PLAY]
PR [ALONG WITH YOU, PRESS 'v' NOW.]
MAKE "CHOI RC
IF :CHOI = "Y [PR [THE COMPUTER WILL
PLAY ALONG.]] [PR [THE COMPUTER WILL
NOT PLAY.]]
PR [Press a key to go on.]
PR RC CLEANUP
END

TO SETUP
SETBG 0
TELL 2 SETPM 0 SETPE 0 102 SETC 15
TELL 10 1) SETC 6
TELL 10 1 2) CS
TELL 2 MEASURE
TELL 2 PU SETPDS [0 -20] SETC 15
PUTSH 1 :NDAT
PUTSH 2 :STAFFLO
PUTSH 3 :STAFFHI
TELL 0 SETSH 2 TELL 1 SETSH 3
TELL 2 SETSH 1
END

TO BEEP :NOTE
SETENV 0 3
TDDT 0 :NOTE 10 20
END

TO PLAY :ST
IF :ST = "A [TYPE [ \ C] SETY -20 DP 2
60.7]
IF :ST = "S [TYPE [ \ d] SETY -15 DP 2
93.3]
IF :ST = "O [TYPE [ \ e] SETY -10 DP 3
30]
IF :ST = "F [TYPE [ \ f] SETY -5 DP 34
7.7]
IF :ST = "G [TYPE [ \ g] SETY 0 DP 391
.1]
IF :ST = "H [TYPE [ \ a] SETY 5 DP 440
]
IF :ST = "J [TYPE [ \ b] SETY 10 DP 49
5]

IF :ST = "K [TYPE [ \ C] SETY 15 DP 52
1.5]
IF :ST = "L [TYPE [ \ D] SETY 20 DP 58
6.6]
IF :ST = "I [TYPE [ \ E] SETY 25 DP 66
0]
IF :ST = "+" [TYPE [ \ F] SETY 30 DP 69
5.4]
IF :ST = "M [TYPE [ \ G] SETY 35 DP 70
2.2]
IF :ST = CHAR 32 [TYPE [ \ ] SETY 0 DP
50000]
OP 50000
END

TO BEEP2 :NOTE
SETENV 0 3
TDDT 0 :NOTE 10 20
TDDT 1 :NOTE / 2 0 20
END

TO REMEM :ST
MAKE "LINE LPUT :ST :LINE
END

TO REPLAY :LINE
IF EMPTY? :LINE [STOP]
IF :CHOI = "Y [BEEP2 PLAY FIRST :LINE
] [BEEP PLAY FIRST :LINE]
REPLAY OF :LINE
END

TO START
SETUP
BEEP2 PLAY "A
DIRECTIONS
GET :NOTE
END

TO CLEANUP
CT
PR [C\=CLEANUP, V\=START OVER, R\=REPLA
Y]
MAKE "LINE []
END

TO GET :NOTE
DEPOSIT 731 255
MAKE "ST RC
IF :ST = "C [CLEANUP GET :NOTE]
IF :ST = "Y [START]
IF :ST = "R [REPLAY :LINE GET :NOTE]
REMEM :ST
IF :CHOI = "Y [BEEP2 PLAY :ST] [BEEP
PLAY :ST]
GET :NOTE
END

MAKE "ST "R
MAKE "STAFFHI [0 12 10 9 9 9 9 9 9
9 9 9 10 12 0]
MAKE "STAFFLO [0 24 40 72 136 136 136
130 141 141 139 137 137 73 42 20]
MAKE "NDAT [0 7 15 12 0 0 0 0 0 104
240 240 240 96 0]
MAKE "CHOI "Y
MAKE "LINE [S O F \ F G H \ H J K \
K K K]

```

TURBO TYPO II

Article on page 43.

LISTING 1

```

CM 3 2080 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
CN 3 2015 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
CZ 3 2015 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
UP 3 2015 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
ZS 3 2025 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
ZT 3 2025 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
ZU 3 2025 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
PH 3 2000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

```

LISTING 2

```

SN 10 CMN CREATE LINE 30226 P00 TUB00 TYP 0
CN 20 REM BY J.O. MCLAUGHLIN
FM 20 REM (C) 1985, ARTIC PUBLISHING
LT 40 CARRIAGE
RS 50 RESIDUE: POSITION 2,6: ? "30226 05="
      :CH05C34):
IE 60 POKE 766,1
IZ 70 FOR I=1 TO 71:HEAD A
HC 00 ? CH05C34):
IC 90 BENT I POKE 766,0
HL 100 POSITION 2,11: "CONT":POSITION 2,
      2:POKE 042,13:STOP
MN 210 POKE 042,127 "LOBE 30226 HAS BEEN
      CREATED":500
FL 120 DATA 109,1,135,25,109,104,133,205
      ,104,133,204,104,104,133,207,109,0,143
      ,253,6,143,254,6,143
PO 130 DATA 255,6,160,0,165,22,133,200,1
      77,204,133,206,24,165,206,109,253,6,14
      1,253,6,144,1,1,230
KM 140 DATA 254,6,175,25,254,6,200,3,208,255
      ,25,254,6,200,23,208,23,190,2,208
      ,208,210,95,34

```

LISTING 3

```

05 : TURBO TYPE
06 : BY J.O. McLAUGHLIN
07 : (C) 1985, ANTIC PUBLISHING
08 :
09 :== 50600
20 BASIC1 = 1709 :FIRST
30 BASIC2 = 1790 :SECOND AND
40 BASIC3 = 1791 :THIRD BYTES OF A
N5 FROM BASIC PROGRAM
50 :LOR HI
60 :STA SCB :ESTABLISH COUNTER
R (TYPE011'S VARIABLE C)
70 :PLA :DISCARD HOF BYTE
5 PASSED
00 :PLA
90 :STA SC0 :HI BYTE OF ADDR1
INES)
0100 :PLA
0110 :STA SCC :LO BYTE OF ADDR1
INES)
0120 :PLA :BASIC ALWAYS PAS
5E5 A HERE AS HI BYTE OF LENCLINES)
0130 :PLA
0140 :STA SCF :LO BYTE OF LENCL
INES)
0150 :LDR #0
0160 :STA BASIC1 :ZERO ALL
0170 :STA BASIC2 :BYTES OF
0180 :STA BASIC3 :ANS
0190 :LDY #0 :SET COUNTER

```

```

0200 LOOPA LOA SC0      ;GET VALUE OF 'C'
0210      STA S00        ;USE AS A COUNTER
0220      LDA (SCC).Y    ;GET CHARACTER FROM
ON LINES
0230      STA SCE
0240 LOOPB CLC          ;LOOPB *MULTIPLY
5* CHAR. BY 'C'
0250      LOA SCE
0260      ADC @ASIC1
0270      STA @ASIC1
0280      OCC ONW
0290      INC @ASIC2
0300      LOA @ASIC2
0310      BNE ONW
0320      INC @ASIC3
0330      ONW DEC S00
0340      BNE LOOPB
0350      INY
0360      INC SC0        ;SAME AS C=C+1
0370      DEC SCF        ;REDUCE NUMBER OF
CHAR.5 REMAINING
0380      BNE LOOPA     ;ALL CHAR.5. PROC
55E0?
0390      RTS          ;YES, THEN RETURN

```



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LISTING 2

Don't type the
TYPO II Codes!

```

00 10 REM GRAPHICS UTILITY PACKAGE REMO
02 20 REM BY RAREK MIHOCKA
04 30 REM (C) 1985, ARMC PUBLISHING
06 40 START=16384
08 42 IF PEEK(START)=76 THEN 50
10 44 POKE 716,64:?"*4" G.U.P. Machine
12 46 LANGUAGE ROUTINES ARE NOT IN MEMORY
14 48
16 46 T 17 " THIS DEMO CANNOT RUN WITH
18 48 THEROUTINES. SEE ARTICLE FOR AD
20 48 DITIONAL INFORMATION." :END
22 48 PR 50 RAMDOM=PEEK(START+3)+256*PEEK(START
24 48 +4)
26 48 RV 60 ORH=PEEK(START+5)+256*PEEK(START+6)
28 48
30 48 78 LET RAMTRA=PEEK(START+7)+256*PEEK(
32 48 START+8)
34 48 HJ 80 LIRE=PEEK(START+9)+256*PEEK(START+1
36 48 0)
38 48 52 90 CIRCLE=PEEK(START+11)+256*PEEK(START
40 48 +12)
42 48 TJ 100 LET CLRR=PEEK(START+13)+256*PEEK(
44 48 START+14)
46 48 TO 110 LET GRAPHICS=PEEK(START+15)+256*PE
48 48 EK(START+16)
50 48 IO 120 C12R=PEEK(START+17)+256*PEEK(START
52 48 +18)
54 48 UO 130 C1RF=PEEK(START+19)+256*PEEK(START
56 48 +20)
58 48 HF 140 TENT=PEEK(START+21)+256*PEEK(START
60 48 +22)
62 48 ZG 150 LET PLOT=PEEK(START+23)+256*PEEK(
64 48 START+24)
66 48 OE 160 LET SET=PEEK(START+25)+256*PEEK(START
68 48 +26)
70 48 PC 170 LET SETCOLOR=PEEK(START+27)+256*PE
72 48 EK(START+28)
74 48 TC 180 8080FF=SET+280
76 48 UO 190 REM BEGIN MAIN PROGRAM
78 48 UJ 200 GOSUB 910
80 48 HT 210 POKE C1OF,1
82 48 GE 220 A=USR(GRAPHICS,13):POKE 752,255
84 48 SI 230 ? "The same routine in G.U. with
86 48 G.U.P."
88 48 TJ 240 ? "Using multiple parameters for a
90 48 feed." :A=USR(SET,85,85,85,85)
92 48 OI 250 FOR TR 79 STEP 3:IT2=T/2:U=159-
94 48 T/2:U2=159-T/2
96 48 LO 260 A=USR(LIRE,T/2,U,UT,T/2,U,UT,T/2,T
98 48 /2)
100 48 5K 270 BEHT TIPOKE 752,255
102 48 VU 280 ? "Twice the pixels in half the t
104 48 ime..."
106 48 FZ 290 ? "How about some multi-color disp
108 48 lay?"
110 48 RR 300 A=USR(SET,164,29,134,165):GOSUB 11
112 48 64:FOR T=79 TO 0 STEP -1
114 48 AC 310 A=USR(LIRE,T/2,T,159-T)
116 48 FC 320 A=USR(LIRE,159-T,159-T,159-T)
118 48 KP 330 BEHT T
120 48 GE 340 GOSUB 1100
122 48 VL 350 A=USR(GRAPHICS,13):POKE 752,255
124 48 GE 360 ? "And now, the Super Fast CIRCLE
126 48 ..."
128 48 RJ 370 ? "80 CIRCLES RAMRA IN 4.8 SECONDS
130 48 (6 CIRCLES PER SECOND)"
132 48 FR 380 FOR V=1 TO 30
134 48 FH 390 A=USR(RAORR)
136 48 RM 400 A=USR(CIRCLE,60+V,60+V,60)
138 48 RM 410 BEHT V
140 48 OR 420 GOSUB 1100
142 48 VF 430 A=USR(GRAPHICS,15)
144 48 PF 440 POKE 752,255:?"None fast circles.
146 48 ..."
148 48 DR 450 FOR 0=0 TO 0 STEP -4
150 48 YZ 460 H=PEEK(20):A=USR(SET,H,H,H,H):A=US
152 48 B(CIRCLE,79,79,8)
154 48 VS 470 A=USR(SET,0,0,0,0):A=USR(CIRCLE,79
156 48 ,79,0,2)
158 48 JM 480 BEHT 0
160 48 OP 490 GOSUB 1100
162 48 GR 500 A=USR(GRAPHICS,15):POKE 752,255
164 48 VI 510 ? "4 And now, some more LIRE drawi
166 48 ng..."
168 48 RV 520 FOR T=0 TO 70
170 48 UE 530 GOSUB 1100
172 48 KK 540 A=USR(LIRE,T,T,T+79,T,T+79,T+79,T
174 48 ,T+79,T,T)
176 48 LV 550 A=USR(SET,0,0,0,0):T=T+1
178 48 KO 560 A=USR(LIRE,T,T+79,T,T+79,T+79,T,
180 48 T+79,T,T)
182 48 KP 570 BEHT T
184 48 RR 580 GOSUB 1100
186 48 RR 590 A=USR(GRAPHICS,15):POKE 752,255:?"
188 48 "None course, circles can be left empty
190 48 "
192 48 TZ 600 GOSUB 1100
194 48 XI 610 PRKE C1OF,0
196 48 FY 620 FOR T=0 TO 50 STEP 2
198 48 FT 630 A=USR(SET,170,170,170,170)
200 48 GS 640 A=USR(CIRCLE,T+45,79,60)
202 48 HR 650 A=USR(SET,0,0,0,0)
204 48 HR 660 A=USR(CIRCLE,T+46,79,60)
206 48 KR 670 BEHT T
208 48 ES 680 GOSUB 1100:A=USR(GRAPHICS,15):POKE
210 48 752,255
212 48 JE 690 ? "4 THE RAM..."
214 48 HK 700 FOR T=0 TO 70:U=3:T=A=USR(SET,U,U,
216 48 U,U)
218 48 HG 710 A=USR(RRH,T,T,159-T,159-T):BEHT T
220 48 RC 720 GOSUB 1100
222 48 HR 730 GRAPHICS 0:POKE 752,255
224 48 RR 740 ? "How about mixed text and graph
226 48 ics?"
228 48 TT 750 FOR T=0 TO 3:POKE COLRR=T,255:BEHT
230 48 T
232 48 HK 760 FOR T=1 TO 50
234 48 KZ 770 A=USR(CIRCLE,PEEK(53770)/2+16,PEEK
236 48 (53770)/2+16,9*PEEK(53770)/40)
238 48 NF 780 PRKE C1OF,PEEK(53770)/256
240 48 UR 790 A=USR(SET,54,0,ARR("This complete
242 48 s the demo"),255)
244 48 HE 800 A=USR(SET,30,24,ARR("of the GRAPH
246 48 IC5 UTILITIES"),255)
248 48 KG 810 BEHT T
250 48 RR 820 PRKE TYPE,0:A=USR(SET,52,0,ARR("
252 48 ",33))
254 48 RR 830 A=USR(SET,20,32,ARR("
256 48 ",26))
258 48 JK 840 POKE TYPE,255:A=USR(SET,54,0,ARR("
260 48 "This completes the demo"),255)
262 48 00 850 A=USR(SET,30,24,ARR("of the GRAPH
264 48 IC5 UTILITIES"),255)
266 48 GE 860 A=USR(C12R,120,5)
268 48 CA 870 A=USR(C12R,120,6)
270 48 00 880 GOSUB 1100
272 48 00 890 GRAPHICS 10:PRKE 712,40:?" M6:?" M6:
274 48 "THANKS FOR WATCHING:?" M6:?" M6:?" M6:?"
276 48 "The"
278 48 00 900 ? "M6:" GRAPHICS UTILITY PA
280 48 GE 910="IN=USR(C12R,400,5):END
282 48 05 910 GOSUB 1000
284 48 0Y 920 A=USR(GRAPHICS,15):POKE 87,7:REM H
286 48 AK BASIC THINK IT'S 10 GR-13.
288 48 IU 930 COLOR 1:PRKE 752,255
290 48 RR 940 ? "Limited by the R.S., BASIC can
292 48 only use 16000 resolution in GRAPHI
294 48 CS 15. It is also slow."
296 48 0I 950 FOR T=0 TO 79 STEP 3:T/2=T/4:U=159-
298 48 T/2:U2=79-T/2
300 48 FC 960 PLOT T,T/2:ORAMTO U,U2:ORAMTO T,U2:
302 48 ORAMTO U,T/2:ORAMTO T,T/2
304 48 KT 970 BEHT T
306 48 05 980 GOSUB 1100
308 48 2H 990 GETURN
310 48 RE 1000 GRAPHICS 10:?" M6:?" M6:?" 10 THE 0
312 48 EG1000"
314 48 00 1010 ? "M6:?" M6:?" THE ATARI 800 "
316 48 UR 1020 ? "M6:?" M6:?" PLOT AND RAMTO "
318 48 0C 1030 FOR T=1 TO 800:BEHT T
320 48 EG 1040 GRAPHICS 1:?" M6:?" M6:?"RM, THANKS
322 48 FOR G.U.P."
324 48 0L 1050 ? "M6:?" M6:?" THE ATARI ALSO HAS"
326 48 JM 1060 ? "M6:?" M6:?" RM, CIRCLE, AND "
328 48 JA 1070 ? "M6:?" M6:?" 800. GRAPHICS MODES"
330 48 RR 1080 GOSUB 1100
332 48 00 1090 GETURN
334 48 ER 1100 POKE 752,255
336 48 UJ 1110 ? "4 GRAPHICS UTILITY PACKAGE REMO
338 48 VE1000"
340 48 FZ 1120 POKE 764,255
342 48 TO 1130 IF PEEK(764)=255 THEN 1130
344 48 GF 1140 POKE 764,255
346 48 AD 1150 GETURN
348 48 0H 1160 A=USR(RAMDOM):GETURN

```

product reviews

COLORTONE KEYBOARD

(Waveform Corp.)
Protecto Enterprises
Box 550
Barrington, IL 60010
(312) 382-5244

Reviewed by Nat Friedland

At \$49, the Colortone Keyboard by Waveform Corp. is not a tool for professional musicians. But nevertheless it is an intriguing Atari music device that puts a surprising amount of musical power and feedback literally at your fingertips.

The Colortone is a recent conversion from a fairly successful Commodore 64 product. As a matter of fact, Antic received its copy just one day after programmer Russ Karnas delivered the conversion software to Waveform. Actually our keyboard's converter hookup is a prototype that dangles exposed on a spliced cable.

Distribution for this product is just getting set up, but one source you should be able to obtain it from is the Protecto mail-order house whose address is shown above. (We recommend that you verify availability by phone before mailing Protecto a check.)

The Colortone is a membrane keyboard, after the fashion of the old Atari 400. It's laid over a sturdy plastic base, but looks a lot like those cardboard piano keyboards that kids in group piano classes used for practicing their fingering.

Once you select your choices from the function keys at the top of the board, you will probably wind up playing mostly on the Color Harp strip above the regular piano-key diagram. The Color Harp gives you only the notes in the scale you have chosen, so you can fool around without the risk of hitting a drastically wrong note.

The Colortone software does a lot of interesting things. You get a choice of seven well done pop/rock two-voice accompaniments or a simple metronome beat. Some of the most common and effective rock patterns are utilized, boogie, ballad, etc.

You have eight instrumental voices to choose from and a variety of musical scales. You can also adjust the speed, pause, and listen to playback of your solo with or without saving it to disk.

As you are playing, the software writes out the musical notation of your solo, showing it above the bass accompaniment notes. At the same time, it also tracks your fingering with red lights over a piano key display.

It is easy to sound pretty good as you play along with the accompaniment by tapping or even rubbing your fingers over the color harp. You can never be drastically out of tune, although you are able to experiment with interestingly dissonant effects if you wish.

A lot of your noodling will sound like the background music from your favorite videogames.

Where Colortone Keyboard eventually shows its limitations is its lack of precision at reflecting musical ideas you are consciously trying to play. It's often nearly impossible to find a specific note you're looking for in the color harp section. And the membrane sensors on the piano diagram don't respond fast enough to pick up speedy passages.

Eventually it seems that no matter what you try to do, you find yourself repeating a consistent pattern of chromatic eighth-note scales as the accompaniment pump steadily along.



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- Q. So why should I pay for quality I don't need?
- A. I can't believe what my ears are telling me! You don't know of the buying on margin? You got always to buy on margin. Everything!
- Q. Buy on margin?
- A. I am drawing you a hypothetical case. You are going to put a steering column in your car, okay? For ten dollars you can get one that will last you two, maybe three years. Then one day it turns to peanut butter while you're driving, and booby!
- Q. For twelve bucks, let's say if you can buy a steering column to last five years. For thirteen fifty you could get one to last 24 billion years, give or take a zillion. Which one do you go for?
- Q. You're talking about a margin of safety, see?
- A. You got it. A margin. You like to live dangerous, maybe? Go for the cheapie, save a buck or two. You got better smarts than that? You buy on margin when you get a steering column. Or a disk.
- Q. Is see your point.
- A. No, that is before the point. Now I tell you the point. You ready?
- You buy on margin and get better than you need; you smile more, right? Fewer wrinkles in the forehead. Your food goes down nicer. All those tension backaches, they go away. Your doctor looks you over and says, "It's a miracle! I can't believe such perfection in a human person!"
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880 Board Set	\$110.00			
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Keyboard not included.				
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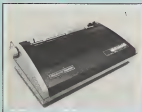
new products



AERO

(printer)
Alphacom
2323 South Bascom Ave.
Campbell, CA 95008
(408) 559-8000
\$249.95

Described as an Epson-compatible dot-matrix printer, the Aero is rated at 130 cps. It uses a 6x9 matrix field, contains a 2K buffer and supports (all on the same line) superscript, subscript, double strike, enlarged and emphasized print and underlining.

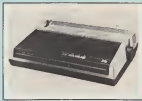


PLUS WRITER

(printer)
Alphacom
2323 SO. BASCOM Ave.
Campbell, CA 95008
(408) 559-8000
\$399

Alphacom claims this new 20 character-per-second daisywheel printer is the perfect printer for your Atari. Plugging directly into your Atari, the PlusWriter emulates the Diablo 630 and uses standard ribbons and daisywheels. We are told that the printer supports superscript, subscript, boldface, proportional spacing and underlining.

New Products notices are compiled by the Antic staff from information provided by the products' manufacturers. Antic welcomes such submissions, but assumes no responsibility for the accuracy of these notices or the performance of the products listed.



GE 3-8100 PRINTER GE PRINTER INTERFACE MODULE

(printer and interface)
General Electric Company
Electronics Park
Syracuse, NY 13221
(315) 456-2446

\$299.95 (printer)
\$89.95 (interface)

GE's foray into the home computer market includes a dot-matrix printer capable of "letter quality" print at 25 cps or regular draft printing at 50 cps.

The interface will connect the printer directly to an Atari.

QUESTBUSTERS

(adventure newsletter)
202 Hglin Court
Wayne, PA 19087
\$15/year

This monthly adventure game newsletter covers recent news, reviews, and the like. It is not Atari-specific.



WIRE TREE PLUS

(line filter)
Network
203 Harrison Place
Brooklyn, NY 11237
(718) 821-7555
\$99.95

This surge/spike filter not only protects electrical lines for computers and peripherals, but also protects two modular phone lines (providing exactly the kind of filtering and protection the Atari 1030 modem doesn't have).

Q-MODEM

(modem)
Quantum Microsystems Inc.
P.O. Box 179
Liverpool, NY 13088
(315) 451-7747
\$149.95

A 300-baud direct connect modem with autodial, autoanswer and other advanced features, the Q-Modem plugs directly into your Atari and fits in the palm of your hand. It even comes with the famous Quantum software, which uses color displays, on-screen menus, a built-in editor, multiple buffers and so on.

Return the favor: When you call a manufacturer or supplier about a product you've seen advertised or otherwise mentioned in ANTIC, please tell them so. This will help us to continue to bring you the latest information about products that will make your Atari computer an even more valuable investment in the future. —ANTIC ED



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